

SUMMARY OF OPERATIONS

California Oil Fields

THIRTY-FIFTH ANNUAL REPORT
OF THE
STATE OIL AND GAS SUPERVISOR
ISSUED BY

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL AND GAS

Vol. 35

SAN FRANCISCO, CALIF., JANUARY-JUNE, 1949

No. 1



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EARL WARREN, GOVERNOR
DEPARTMENT OF NATURAL RESOURCES
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DIVISION OF OIL AND GAS

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PREFACE

Publication of the report of the State Oil and Gas Supervisor in monthly installments commenced with April, 1919. The report was published in quarterly installments July, 1929, to June, 1939, inclusive. Volumes 25, 26 and 27 (July, 1939-December, 1941) were published as annual reports in single volumes. Beginning with Vol. 28, No. 1 (January-June, 1942) the reports are published semiannually.

Special articles dealing with the various phases of oil field operations appear in the report. These articles present the results of observations of engineers of the Division of Oil and Gas. Short articles of a suitable nature, written by operators or outside engineers, are also accepted for publication. A complete list of all special articles published to date is given in each number of the "Summary of Operations," and an alphabetical index of these articles is given in No. 12 (June) of Vols. 11 to 14, inclusive, in No. 4 of each of Vols. 15 to 24, inclusive, and thereafter in each issue.

The Division of Oil and Gas aims to serve the oil operators of California by furnishing them with the best information obtainable by statewide scientific observation. The purpose is to have all wells drilled and maintained in accordance with the most approved methods. The desired end can only be attained by careful study and attention to many details.

Branch Offices of the Division, maintained in the various oil fields, afford the oil operators an opportunity promptly and informally to avail themselves of the service which is at their disposal.

Errors appearing in this publication will be corrected as soon as brought to the attention of the Supervisor. All readers are invited to assist the Division by calling attention to errors and also by giving suggestions which might add to the usefulness of the "Summary of Operations."



INDEX FOR OIL AND GAS FIELDS SHOWN ON OPPOSITE PAGE

Map No.	Field	Locality	Map No.	Field	Locality
	Afton (gas)	a		Millar (gas)	d
18A	Aliso Canyon			W. Montalvo	v
35	Ant Hill		37	Montebello	
11	Antelope Hills			Moody Gulch	q
19	Arroyo Grande		48	Mountain View	
18	Bardsdale		34	Mt. Poso	
11	N. Belridge		18A	Newhall	
10	S. Belridge		18A	Newhall-Potrero	
	Beverly Hills	y	60	Newport	
12	Blackwells Corner		60	W. Newport	
	Bowerbank (gas)	t	11	North Belridge	
4	Brea Olinda		9	North Midway	
8	Buena Vista Hills		36	North Dome, Kettleman	
	Buttes (gas)	b	18A	Oak Canyon	
54	Buttonwillow (gas)		17	Ojai-Santa Paula	
	Cache Slough (gas)	f	3	Orcutt	
55	Canal			Oxnard	w
55	Canfield Ranch		56	Paloma	
43	Capitan			Petaluma	m
3	Casmalia		18	Piru	
2	Cat Canyon		42	Playa del Rey	
	Chowchilla (gas)	r	14	Pleasant Valley	
14	Coalinga		13A	Poso Creek	
55	Coles Levee		41	Potrero	
	Conejo	x		Pyramid Hills	s
4	E. Coyote		59	Raisin City	
39	W. Coyote		46	Richfield	
45	Cuyama		16	Rincon	
10	Cymric		53	Rio Bravo	
9	Cymric, Portion of		57	Rio Vista (gas)	
18A	Del Valle		59	Riverdale	
12	Devils Den		30	Rosecrans	
29	Dominguez		35	Round Mountain	
14	East Coalinga Extension		45	Russell Ranch	
4	East Coyote			Salt Lake	z
48	Edison		47	San Ardo	
15	Elk Hills		7	San Emidio	
52	El Segundo		27	Santa Fe Springs	
40	Elwood		51	Santa Maria Valley	
	Fairfield Knolls (gas)	e	17	Santa Paula-Ojai	
49	Fruitvale		1	Sargent	
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59	Helm		18	Simi	
26	Huntington Beach		10	South Belridge	
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14	Jacalitos		8	South Midway	
35	Kern Bluff		55	Strand	
13A	Kern Front			Suisun Bay (gas)	h
13	Kern River			Summerland	u
36	Kettleman North Dome		7	Sunset	
	Kirby Hill (gas)	g	61	Tejon	
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59	Lanare Area		55	Ten Section	
52	Lawndale			Thornton (gas)	j
	Lodi (gas)	k	28	Torrance	
3	Lompoc			Tracy (gas)	p
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	Los Angeles	x	38	Turnbull	
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	McDonald Island (gas)	n	54	Wasco	
9	McKittrick		39	West Coyote	
	Maine Prairie (gas)	e		West Montalvo	v
44	Mesa		60	West Newport	
36	Middle Dome, Kettleman		61	Wheeler Ridge	
9	N. Midway		38	Whittier	
8	S. Midway		50	Wilmington	
			2	Zaca	

Figures indicate number of oil field maps, as listed on Page 2.

No maps published for fields located by letters.

STATE OF NEW YORK

IN SENATE

JANUARY 1, 1901

REPORT

OF THE

COMMISSIONERS OF THE LAND OFFICE

FOR THE YEAR 1900

ALBANY:

ANDREW D. DODD, PRINTING OFFICE

1901

THE STATE OF NEW YORK

IN SENATE

JANUARY 1, 1901

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REPORT

OF THE

PALOMA OIL FIELD

By G. G. PEIRCE¹

INTRODUCTION

The Paloma oil field is situated on the floor of the San Joaquin Valley, approximately 17 miles southwest of the city of Bakersfield, Kern County.

The general area is flat alluvium-covered land, originally barren but now rather extensively developed for agricultural purposes. The topography offers no indication of underlying structure, the discovery of the field resulting from geophysical surveys as was the case in the several fields up the center of the valley to the north.

Prior to the discover of oil, the field was known as the Buena Vista Lake Gas field, this phase being covered in detail in an earlier report.² Upon the completion of the discovery well in the oil zone in 1939, the name was changed to Paloma oil field, the new boundaries including the dry gas area.

Acknowledgment is hereby made of the use of information obtained in the report by James T. Wood, Jr.³

HISTORY

The aforementioned article on the dry gas area includes a discussion of the first well in the field to penetrate the Miocene formations in which the Stevens sand section occurs, the top productive portion of this zone being now referred to as the Paloma sand. This well, The Ohio Oil Company, No. "KCL-A" 8, Sec. 32, T. 31 S., R. 26 E., M. D. B. & M., shown on cross-section B-B', Plate III, although situated high on the structure and encountering evidences of accumulation, failed to develop commercial production and was abandoned in February 1939. The next test, Western Gulf Oil Company well No. 54-3 "KCL-A" (now "Paloma Unit" 54-3), Sec. 3, T. 32 S., R. 26 E., was successfully completed on August 31, 1939, as the discovery well of Paloma oil field. Spudded in on May 8, 1939, the well was drilled to a total depth of 10,178 feet and a water shut-off effected by 7½-inch casing cemented at 9997 feet, the top of the Stevens sand being logged at 10,014 feet. A packer was set at 9980 feet, with perforated tailpiece to 10,161 feet and a flow test made on the open hole from 9997 to 10,178 feet. During a two-hour test, the well produced 82 barrels of 50-degree gravity condensate with gas at the rate of 10,140 Mcf. per day through a ¾-inch orifice. The bottom hole pressure, under flowing and static conditions, was recorded at 4100 and 4800 pounds per square inch, respectively. A 5½-inch, 100 mesh perforated liner was then landed at 10,175 feet and the well completed through 2-inch tubing hung at 9928 feet. The production rate during the first 30 days was 200 barrels per day of 50.1-degree gravity clean oil and 1,221 Mcf. per day of gas with a tubing pressure of 3400 p.s.i., and casing pressure

¹ Senior Oil and Gas Engineer, Division of Oil and Gas.

² Kaplow, E. J.—"Gas Fields of Southern San Joaquin Valley." Summary of Operations—1938—Vol. 24, No. 1.

³ Wood, James T., Jr.—"Geology and Development of the Paloma Field, Kern County, California." Petroleum Development and Technology—1942—A.I.M.E., Petroleum Division.

at 3300 p.s.i. The well is reported to have had an indicated potential rate of 2280 barrels per day of oil with 14,750 Mcf. of gas.

At an early stage it was recognized that Paloma field was of the so-called "condensate" or "distillate" type in that all the hydrocarbons, in at least that portion of the reservoir explored at the time, existed in the gaseous phase. For a brief discussion of condensate fields and the problems inherent thereto, the reader is referred to the estimate of natural gas reserves prepared jointly by the Railroad Commission and the Department of Natural Resources, Division of Oil and Gas.⁴

The need for a co-operative program to properly develop and operate the field led to the "Paloma Unit Plan," the initial steps in this direction being described in an article by W. H. Geis.⁵

In March 1941 all producing wells were shut in by mutual agreement among the operating companies pending the execution of the unit plan by the Paloma Operators' Committee. Gas injection operations were commenced in December 1941 with a small pilot plant. Except for one or two wells to supply gas for injection purposes, the remainder were shut in until the early part of 1944. The Unit Plan became effective July 1, 1942, with Western Gulf Oil Company the designated operator of the participating wells and lands. The larger injection plant was completed in July 1943 and placed in full operation the following December, when 1,663,126 Mcf. of gas, representing nearly 90 per cent of that produced during the month, was returned to the Paloma zone.

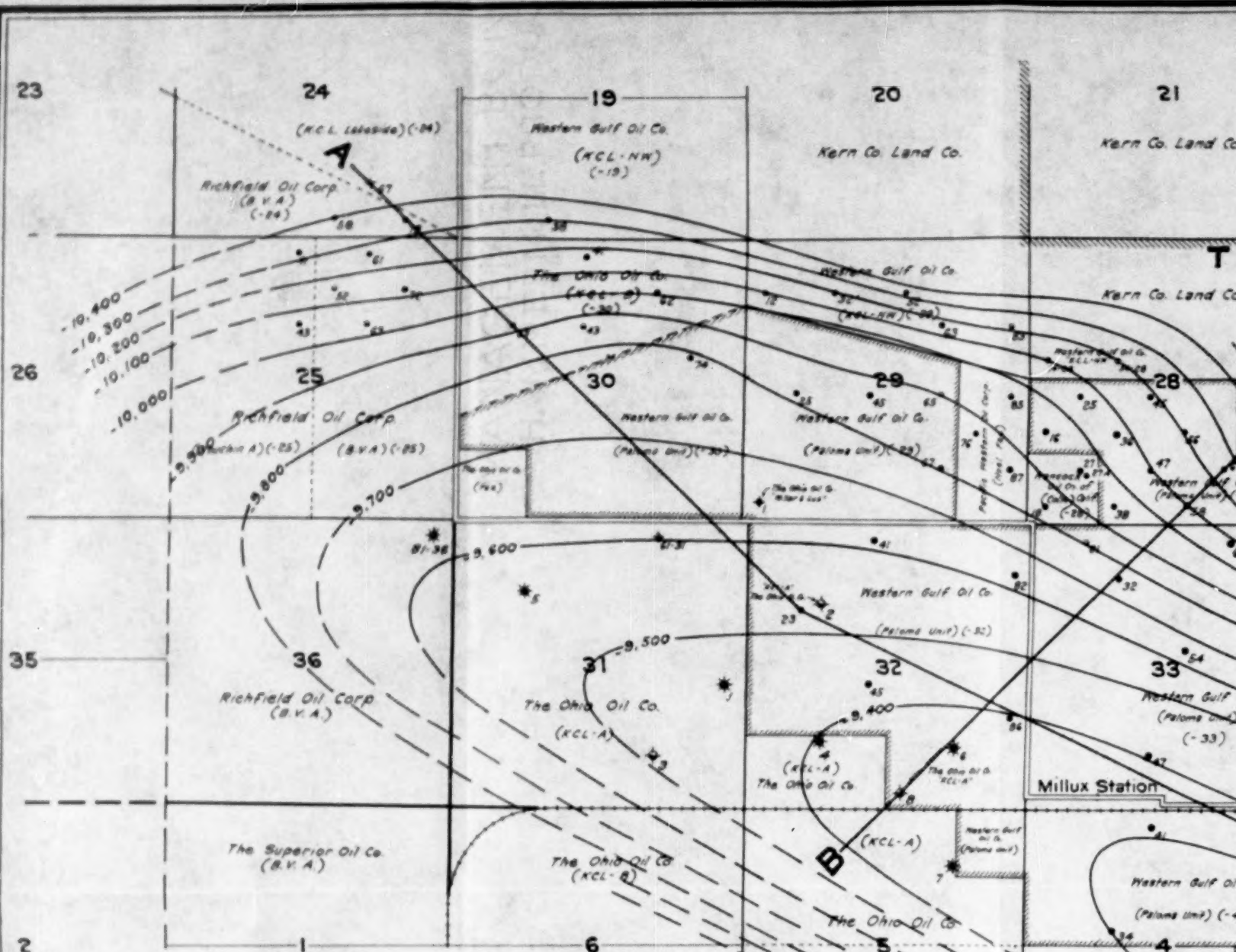
In the meantime the completion of well No. "Gallagher" 61-33, Sec. 33, T. 31 S., R. 26 E., (now "Paloma Unit" 61-33), by General Petroleum Corporation extended the proved limits a mile to the north end, of greater significance, demonstrated the existence of "black oil" accumulation on the flank of the structure. The well was placed on production October 11, 1942, for an initial production of 1000 barrels per day of 36-degree gravity clean oil, with a gas-oil ratio of 1000 cubic feet per barrel. Another interesting development was the discovery, in Western Gulf Oil Company well No. "Symons Dev. Co." 12-7, Sec. 7, T. 32 S., R. 27 E., of a new productive sand occurring several hundred feet above the Paloma sand on the southeasterly nose of the structure. This well was placed on production April 3, 1942, for an initial production of 37 barrels per day of 49.8-degree gravity clean oil and 303 Mcf. of gas per day.

During 1944 the development rate accelerated and continued to increase as the emphasis shifted to the "black oil" belt along the northeast flank, and the productive limits of the field were extended. A number of operators obtaining production along the northeast flank subsequent to 1944 have not become participants in the unit plan.

In 1948 Western Gulf Oil Corporation and The Texas Company, members of the Paloma Unit, filed suit in the Superior Court of Kern County against the non-unit operators. The complaint alleged that the defendants were operating in such a manner as to cause waste of oil and gas and damage to the plaintiffs. It was claimed that the failure of the non-unit operators to cycle or return their gas to the reservoir and maintain the pressure therein would result in a large quantity of oil becoming unrecoverable due to retrograde condensation.

⁴ Case No. 4591, Special Study No. S-525—June 1, 1946—pp. 11-13.

⁵ Geis, W. H.—"A Plan for the Operation of the Paloma Field." Petroleum Development and Technology—1942—A.I.M.E., Petroleum Division.



MAP OF
PALOMA OIL FIELD
 KERN COUNTY, CALIF.
 SHOWING
CONTOURS ON "MM" MARKER

ACCOMPANYING REPORT BY G.G. PEIRCE

DIVISION OF OIL & GAS
 R.D. BUSH, STATE OIL & GAS SUPERVISOR

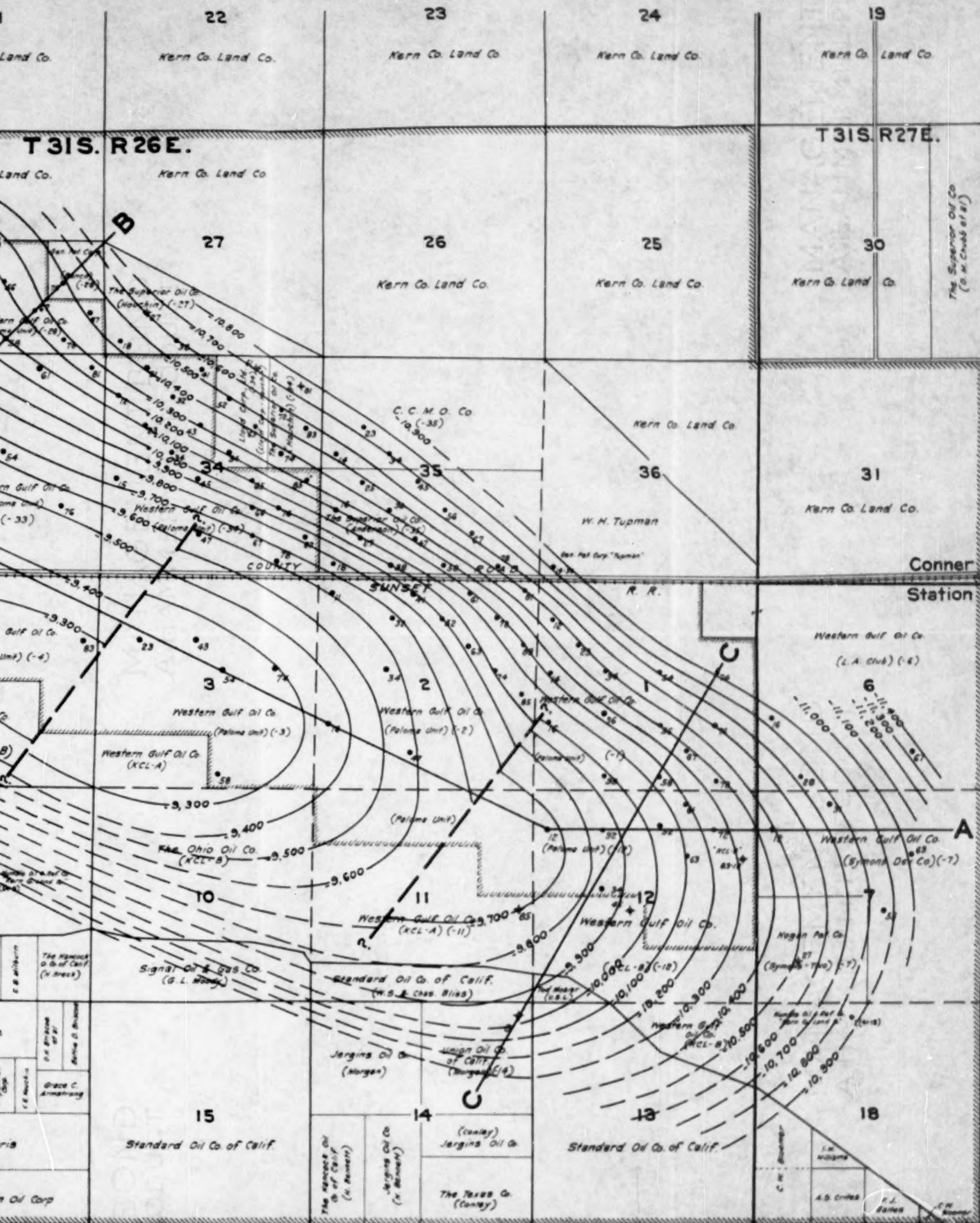
SCALE
 0 2000 4000 6000 8000 FT.

NOVEMBER 1949

LEGEND

- Uncompleted drilling
 - Uncompleted idle
 - Uncompleted abandoned
 - Completed producing
 - Completed idle
 - Completed abandoned
 - Water
 - Uncompleted abandoned converted to water
 - Completed abandoned converted to water
 - Gas
 - Gas abandoned
- Datum - Sea Level
 Contour interval 100 Ft.

Andrews (V.S.L.)	J. H. Smith & H. H. Brown	J. J. Lammert	John F. Miller	W. H. Tugman & C. W. Bloomer	Alfred G. Galt H. B. Williams
C. Cohn Estate					
Standard Oil Co. of Calif.					
F. L. Morris					
Pacific Western Oil Co.					



T32S. R26E.

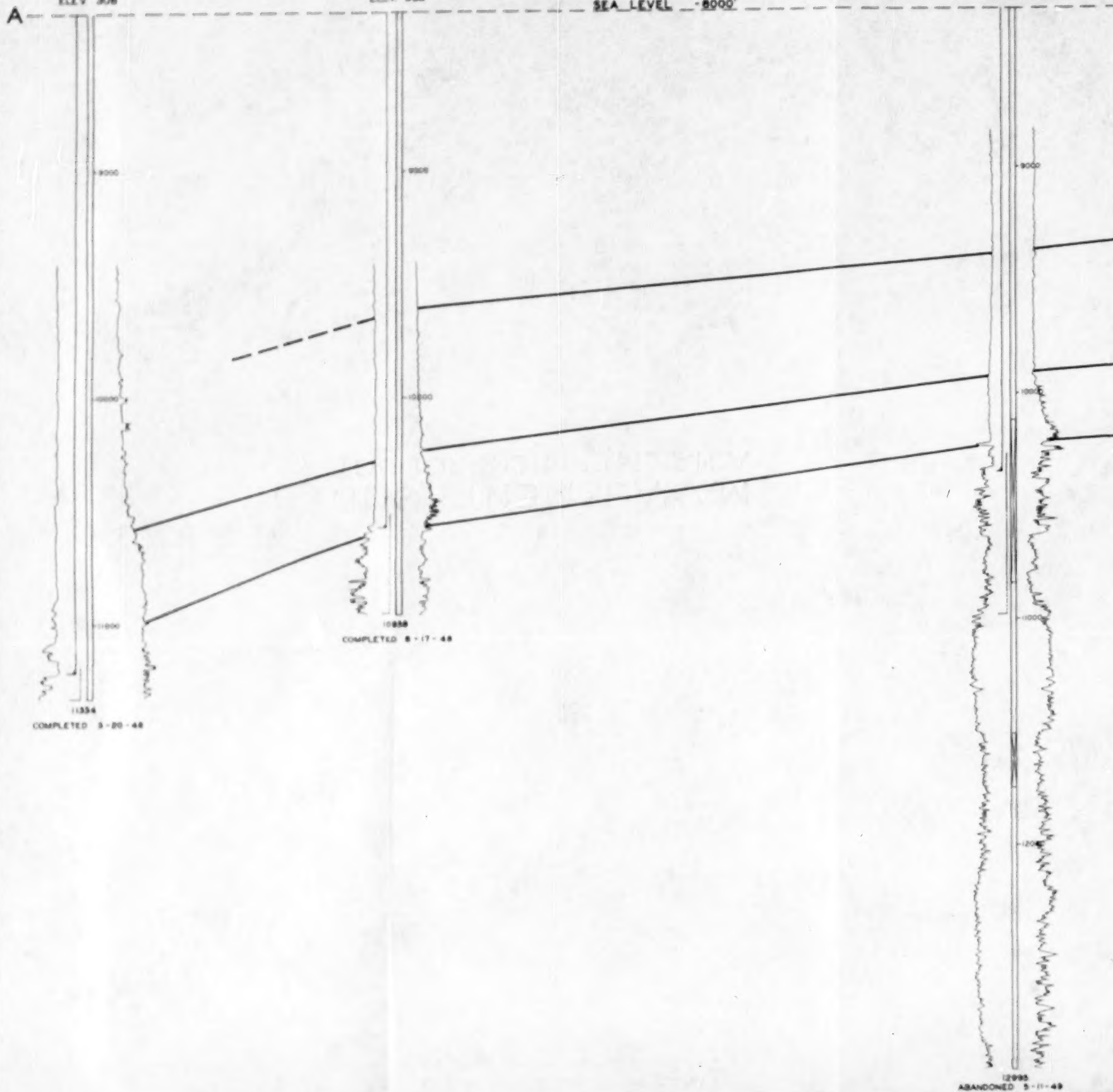
T32S. R27E.

RICHFIELD OIL CORP.
"BVA" 78-24
ELEV 308

THE OHIO OIL CO.
"KCL/B" 23-30
ELEV 303

THE OHIO OIL CO.
"KCL/A" 81-31
ELEV 302

SEA LEVEL -8000'



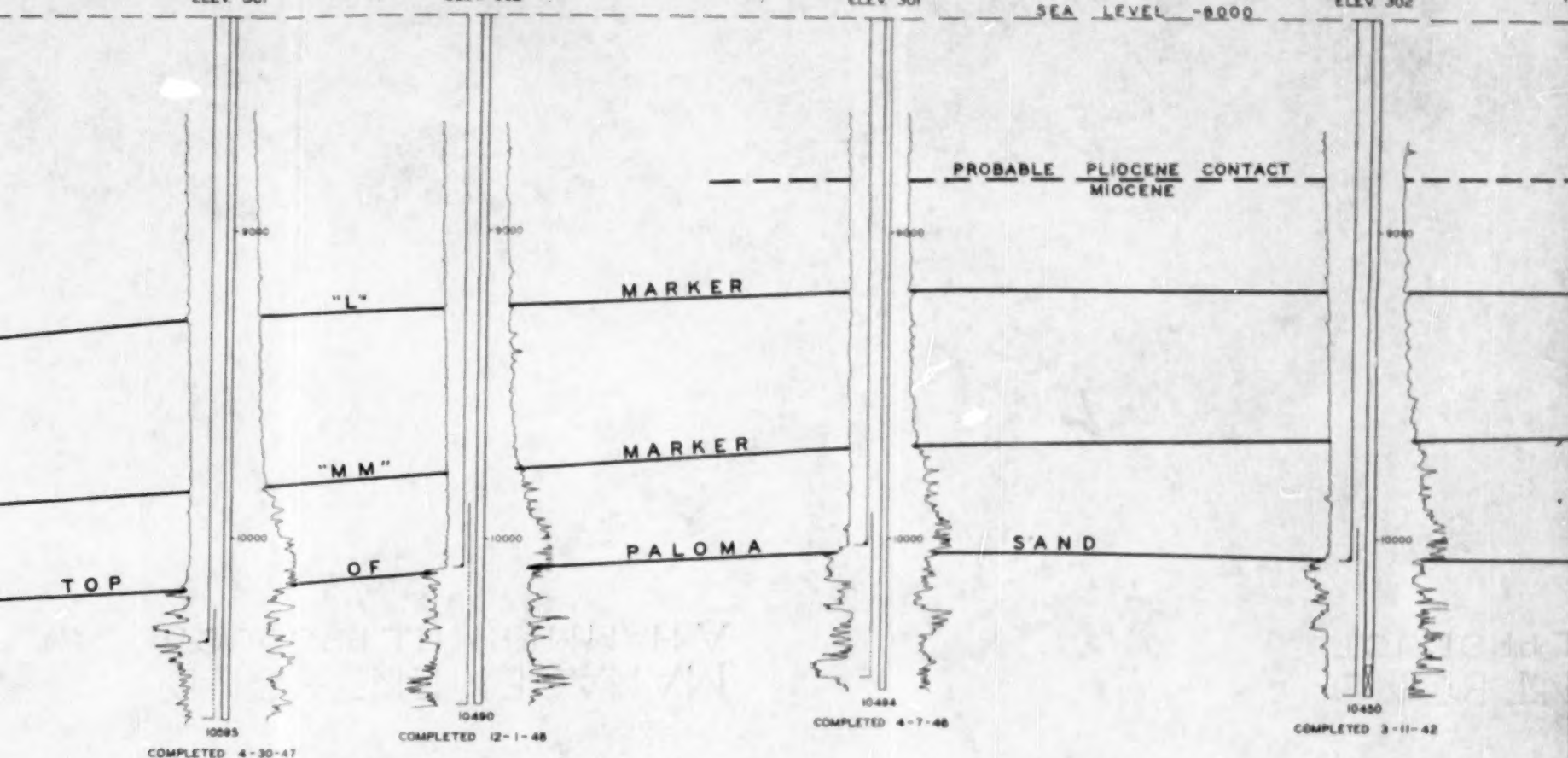
WESTERN GULF OIL CO.
"PALOMA UNIT" 23-32
ELEV 301

WESTERN GULF
OIL CO.
"PALOMA UNIT" 45-32
ELEV 302

WESTERN GULF OIL CO.
"PALOMA UNIT" 86-32
ELEV 301

WESTERN GULF OIL CO.
"PALOMA UNIT" 41-4
ELEV 302

SEA LEVEL -8000

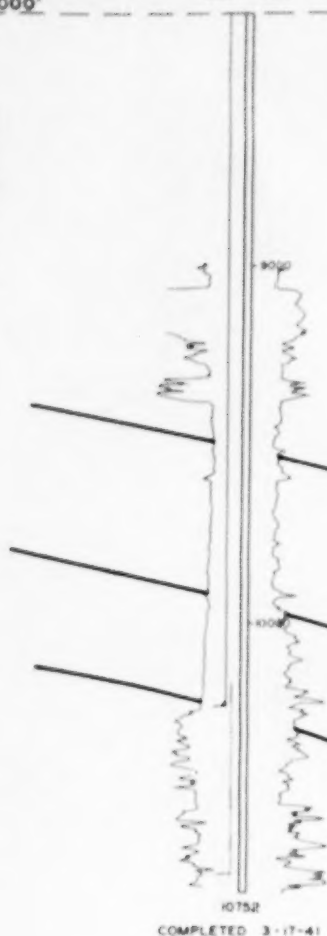


WESTERN GULF OIL CO.

"PALOMA UNIT" 12-12

ELEV 296

-8000'

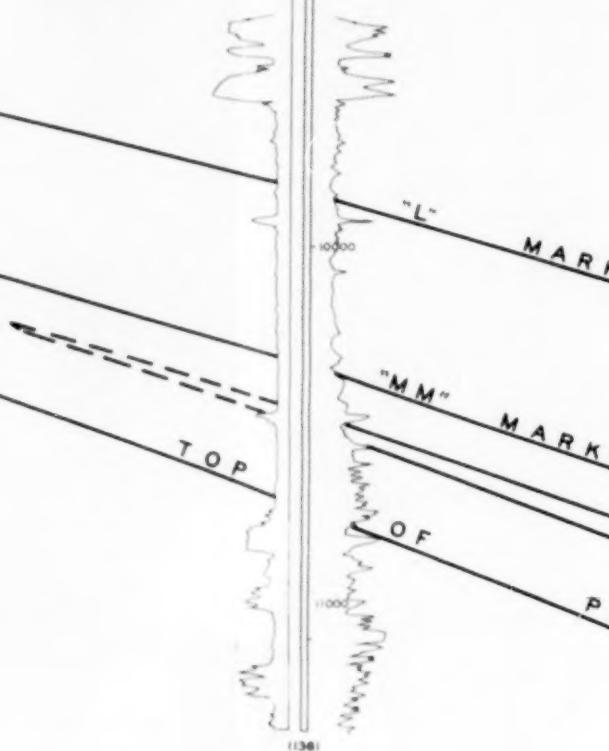


WESTERN GULF OIL CO.

"PALOMA UNIT" 52-12

ELEV 302

-8000'



COMPLETED 3-25-45

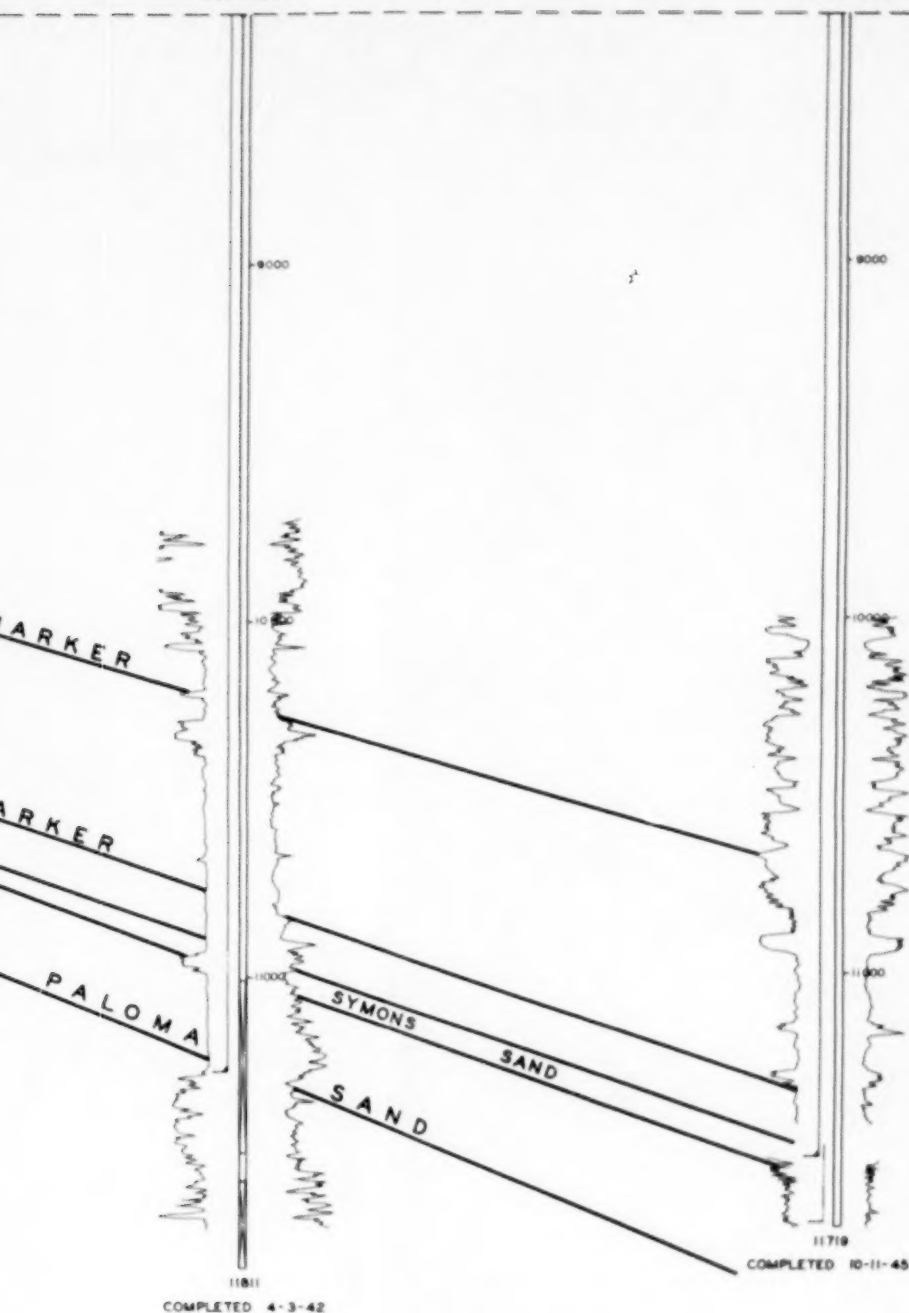
WESTERN GULF OIL CO.

"SYMONS DEV. CO." 12-7
ELEV 297

WESTERN GULF OIL CO.

"SYMONS DEV. CO." 63-7
ELEV 309

A



WESTERN GULF

OIL CO.

"PALOMA UNIT" 83-4

ELEV. 300

WESTERN GULF

OIL CO.

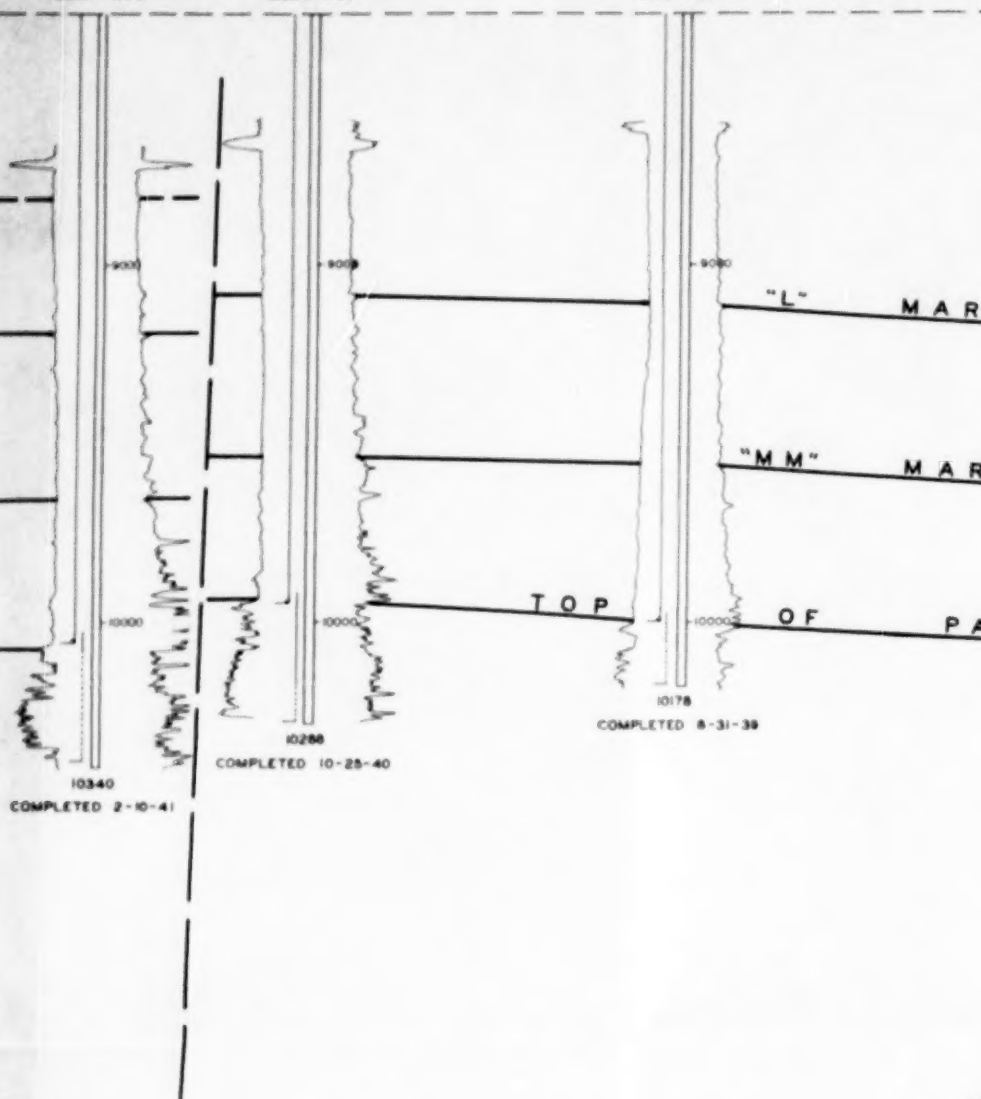
"PALOMA UNIT" 23-3

ELEV. 301

WESTERN GULF OIL CO.

"PALOMA UNIT" 54-3

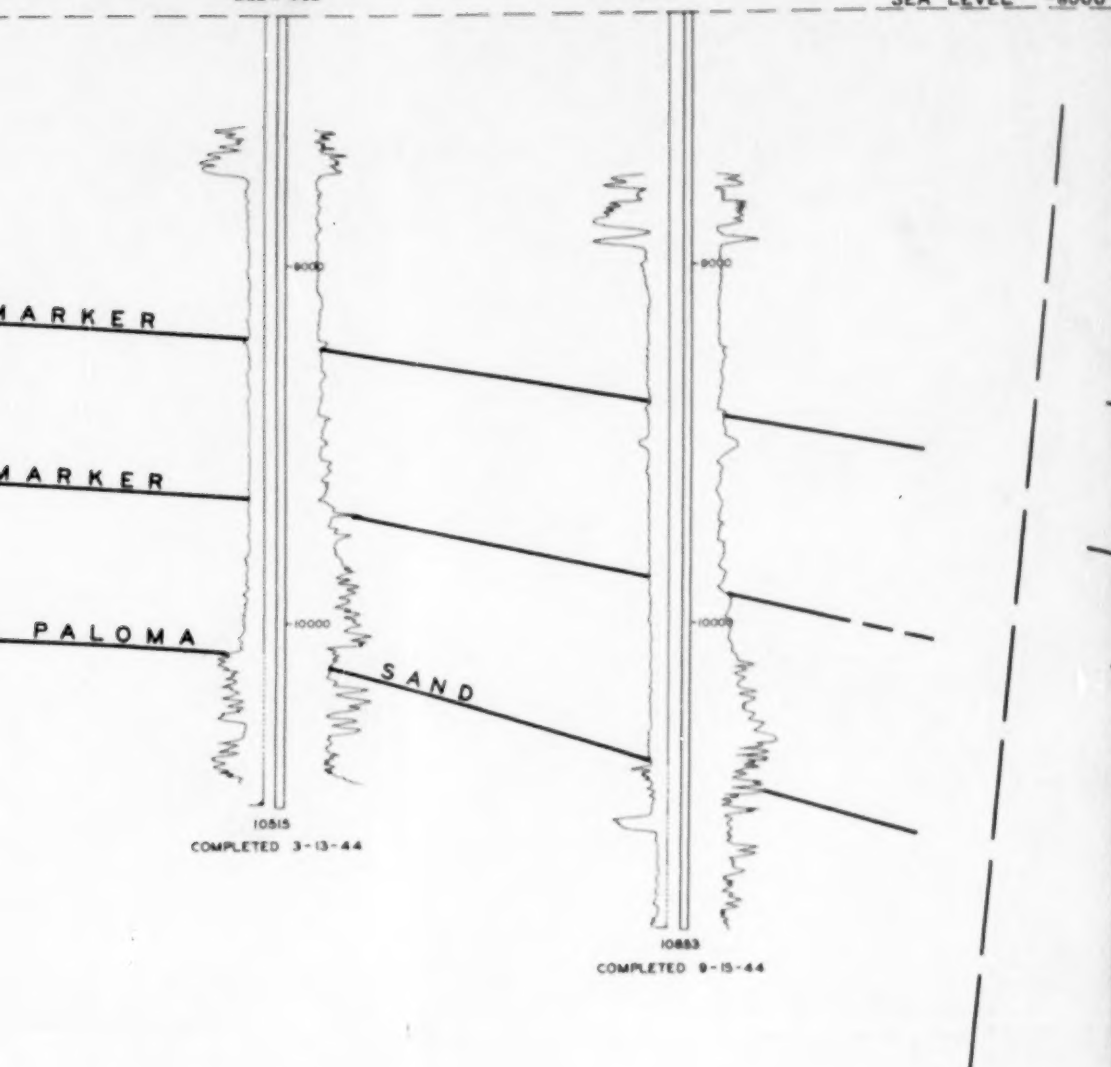
ELEV. 298



WESTERN GULF OIL CO.
"PALOMA UNIT" 18-2
ELEV 302

WESTERN GULF OIL CO.
"PALOMA UNIT" 47-2
ELEV 301

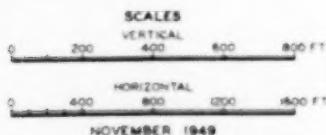
SEA LEVEL -8000'



CROSS SECTION A-A
PALOMA OIL FIELD
KERN COUNTY, CALIF.

ACCOMPANYING REPORT BY G.G. PEIRCE

DIVISION OF OIL & GAS
R.D. BUSH, STATE OIL & GAS SUPERVISOR



FOR LOCATION SEE PLATE I

THE OHIO OIL CO.

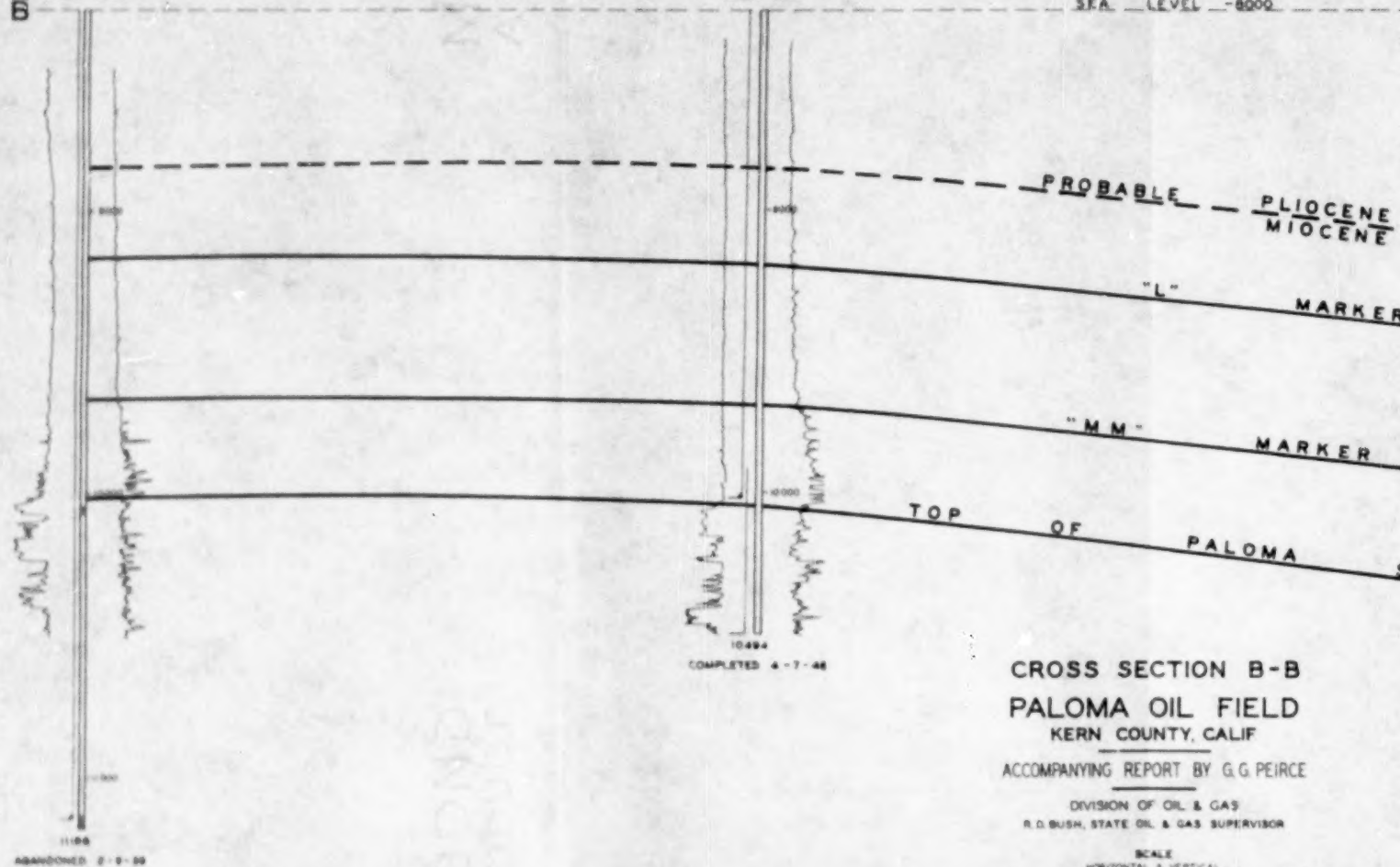
"RCU-A" #
ELEV 295

WESTERN GULF OIL CO.

"PALOMA UNIT" #6-32
ELEV 301

SEA LEVEL -8000

B



CROSS SECTION B-B
PALOMA OIL FIELD
KERN COUNTY, CALIF

ACCOMPANYING REPORT BY G.G. PEIRCE

DIVISION OF OIL & GAS
R.D. BUSH, STATE OIL & GAS SUPERVISOR

SCALE
HORIZONTAL & VERTICAL
0 200 400 600 800 1000 FT.
NOVEMBER 1948

FOR LOCATION SEE PLATE 1

WESTERN GULF OIL CO.

"PALOMA UNIT" 32-33

ELEV. 300

WESTERN GULF OIL CO.

"PALOMA UNIT" 58-28

ELEV. 303

WESTERN GULF OIL CO.

"PALOMA UNIT" 87-28

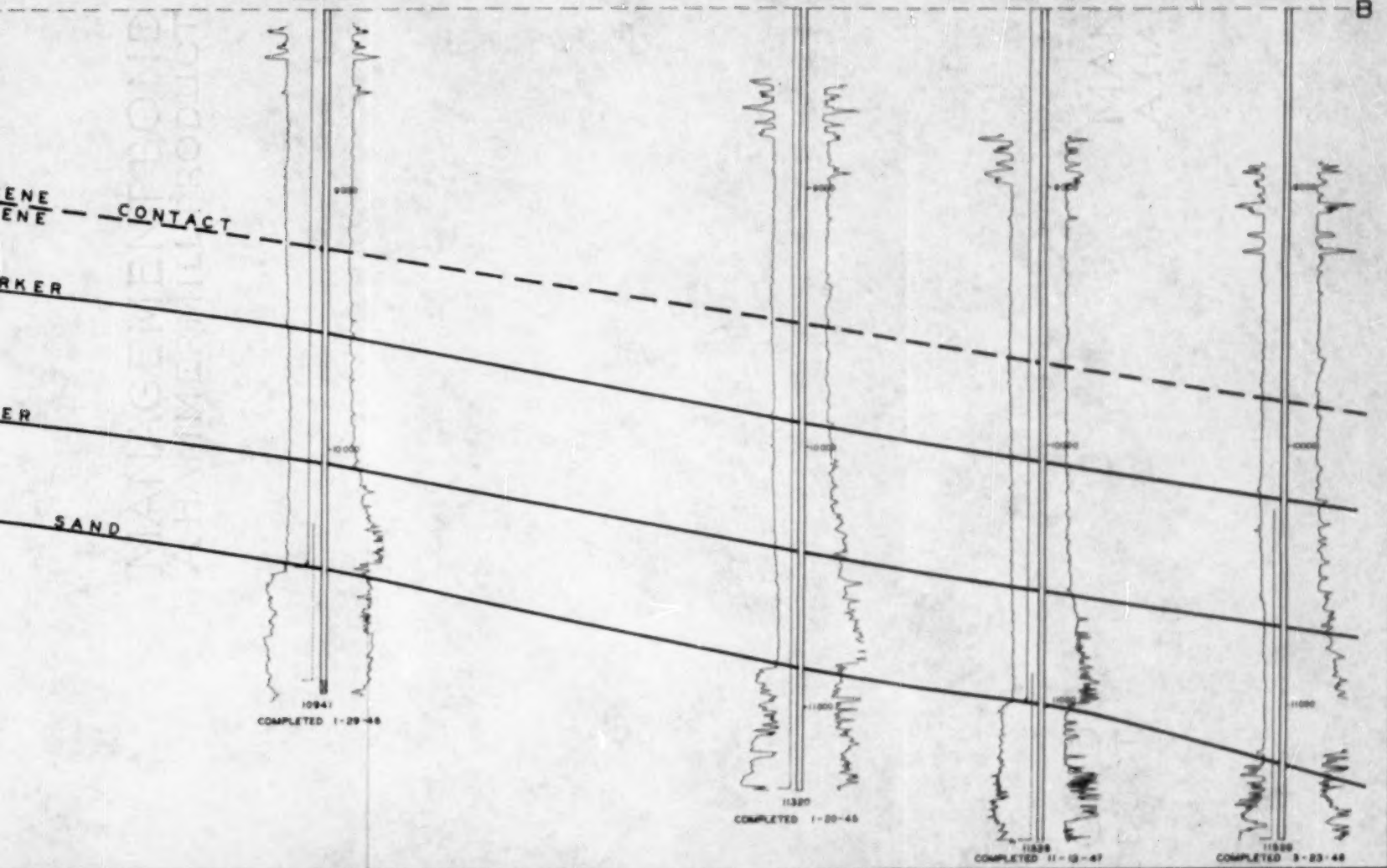
ELEV. 306

GEN. PET. CORP.

"BENCO" 78-28

ELEV. 304

B



UNION OIL CO. OF CALIF.

"MORGAN" 8-14

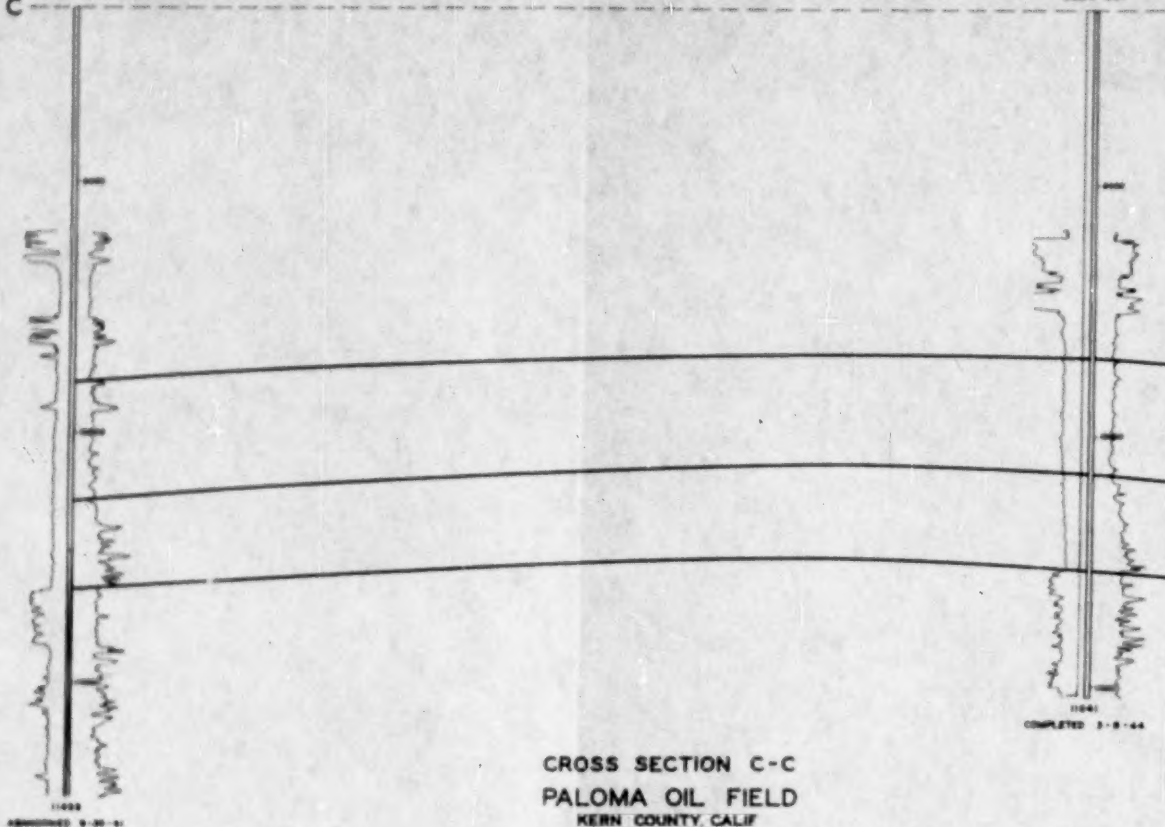
ELEV. 308

C

WESTERN GULF OIL

"PALOMA UNIT" 34-12

ELEV. 301



ADMITTED 9-20-41

COMPLETED 3-8-44

CROSS SECTION C-C
PALOMA OIL FIELD
KERN COUNTY, CALIF.

ACCOMPANYING REPORT BY G.G. PEIRCE

DIVISION OF OIL & GAS
R. S. BUSH, STATE OIL & GAS SUPERVISOR

SCALE
HORIZONTAL 5 FEET
VERTICAL 100 FEET
NOVEMBER 1940

FOR LOCATION SEE PLATE 1

WESTERN GULF OIL CO.
UNIT 34-12
301

WESTERN GULF OIL CO.
PALOMA UNIT 58-1
ELEV. 301

WESTERN GULF
OIL CO.
PALOMA UNIT 67-1
ELEV. 302

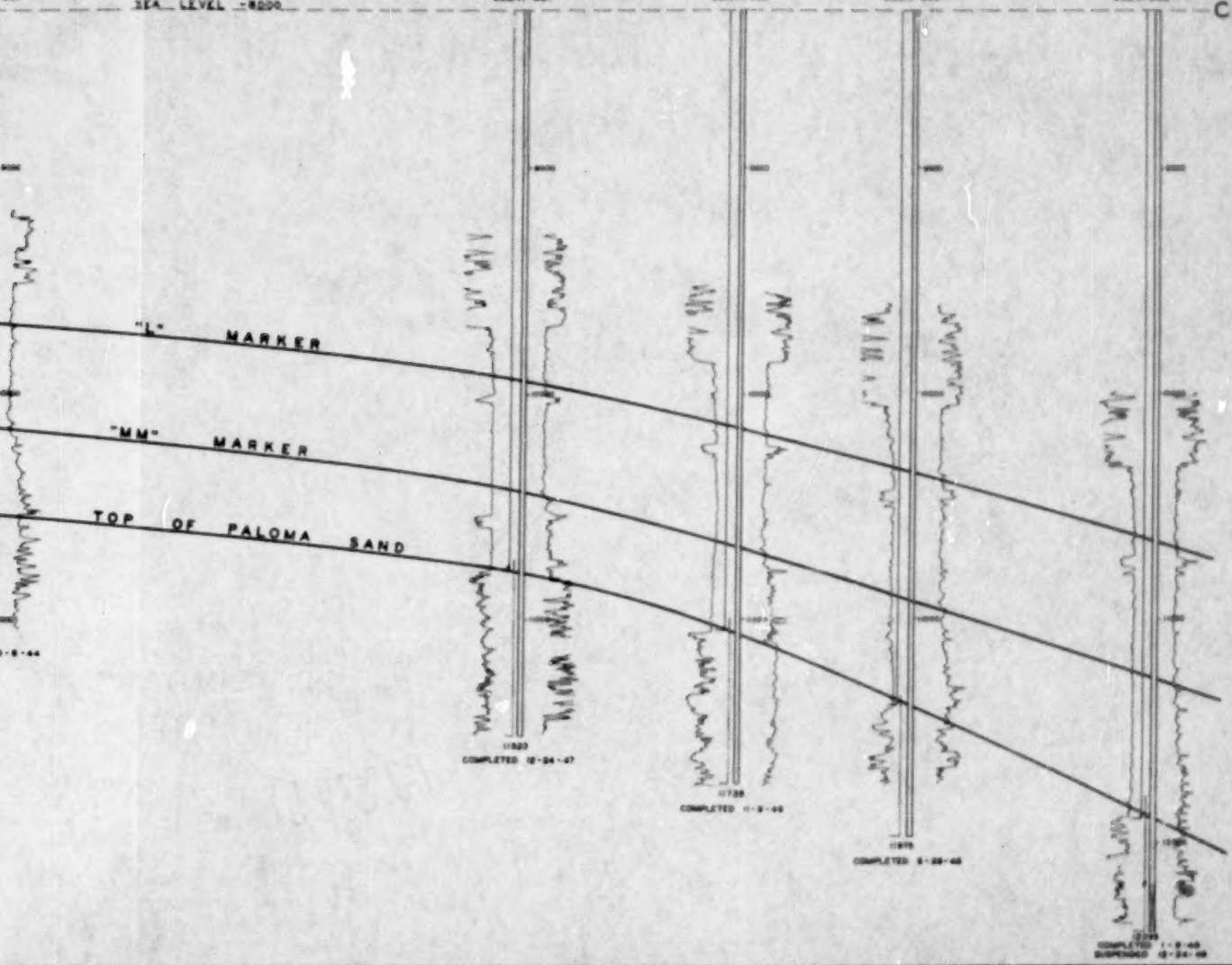
WESTERN GULF OIL CO.
PALOMA UNIT 78-1
ELEV. 303

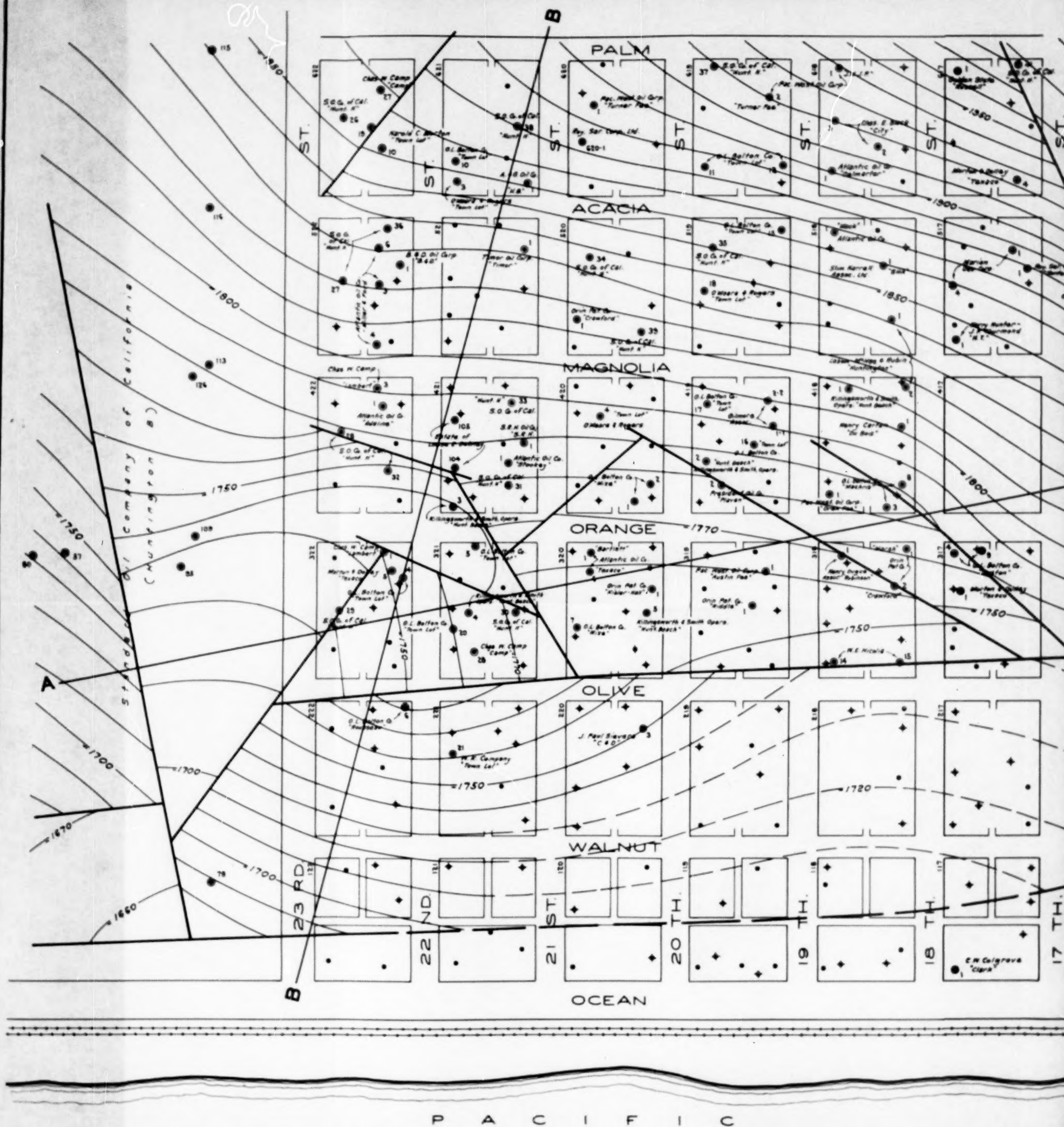
WESTERN GULF OIL CO.
PALOMA UNIT 74-1
ELEV. 302

PLATE IV

C

SEA LEVEL -8000





MAP OF
TOWN LOT AREA
HUNTINGTON BEACH OIL FIELD
ORANGE COUNTY, CALIF.
SHOWING CONTOURS ON
TOP OF UPPER TAR SAND
ACCOMPANYING REPORT BY J. M. CARLS

DIVISION OF OIL & GAS
R.D.BUSH, STATE OIL & GAS SUPERVISOR

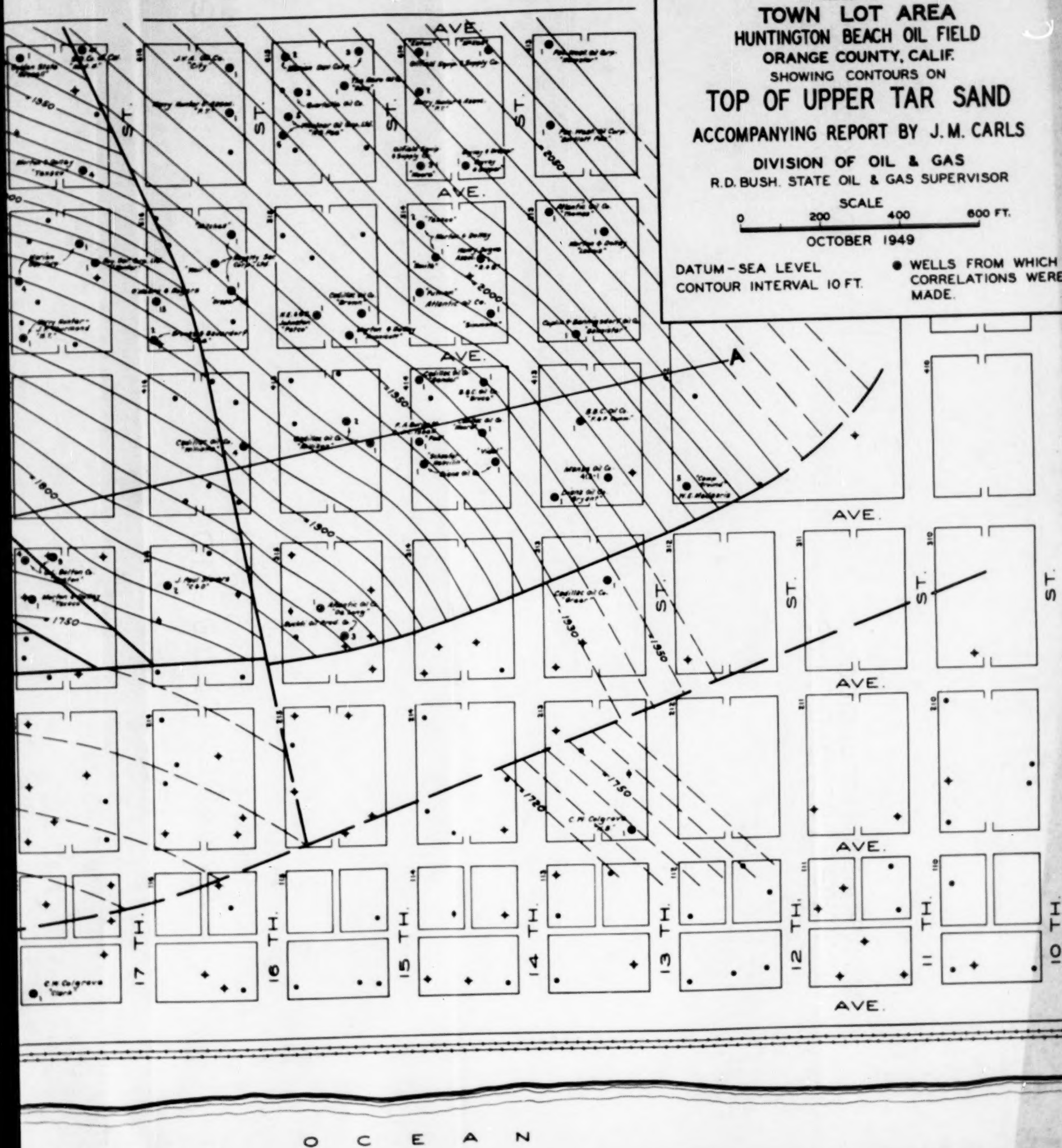
SCALE

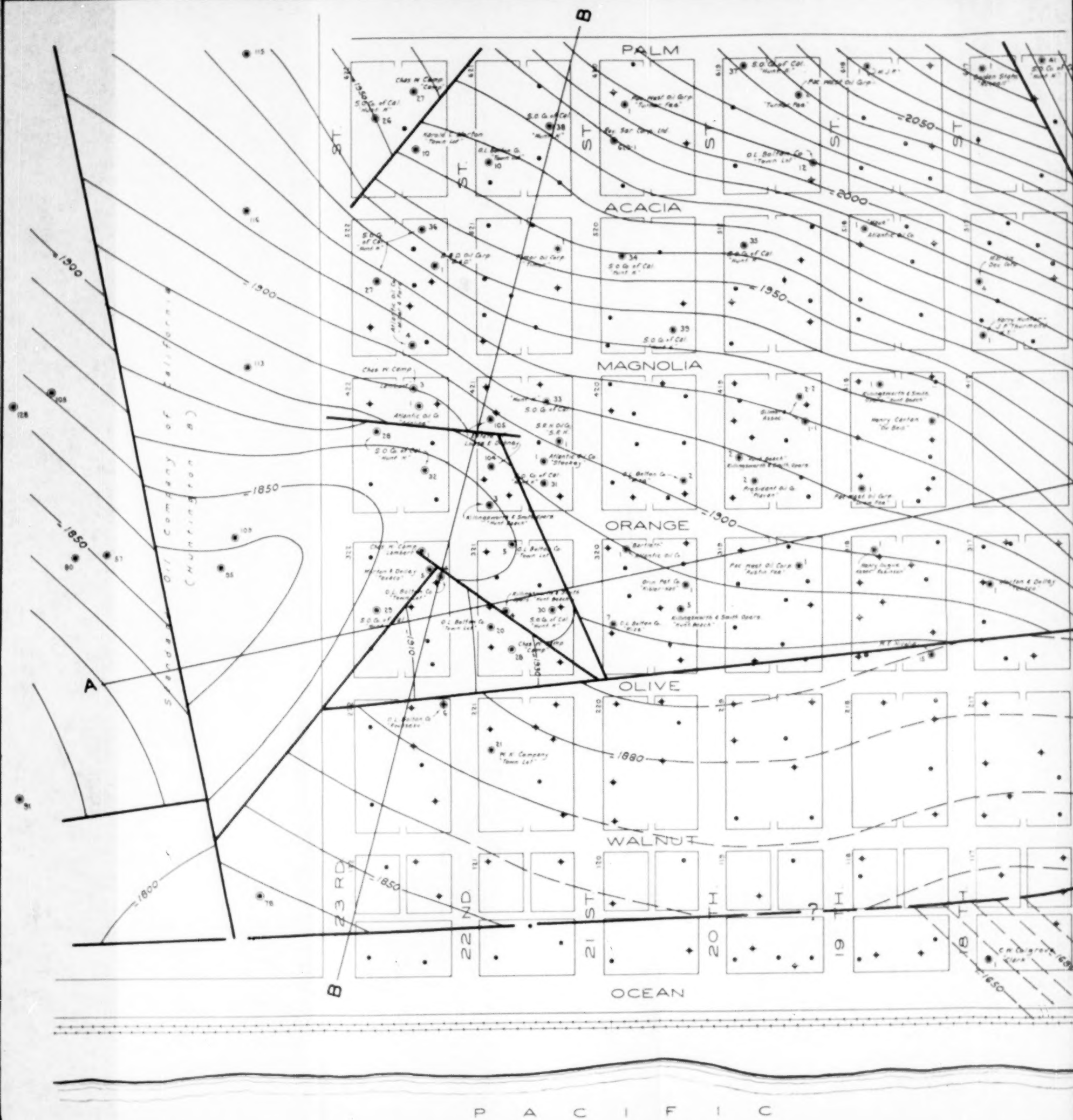
0 200 400 600 FT.

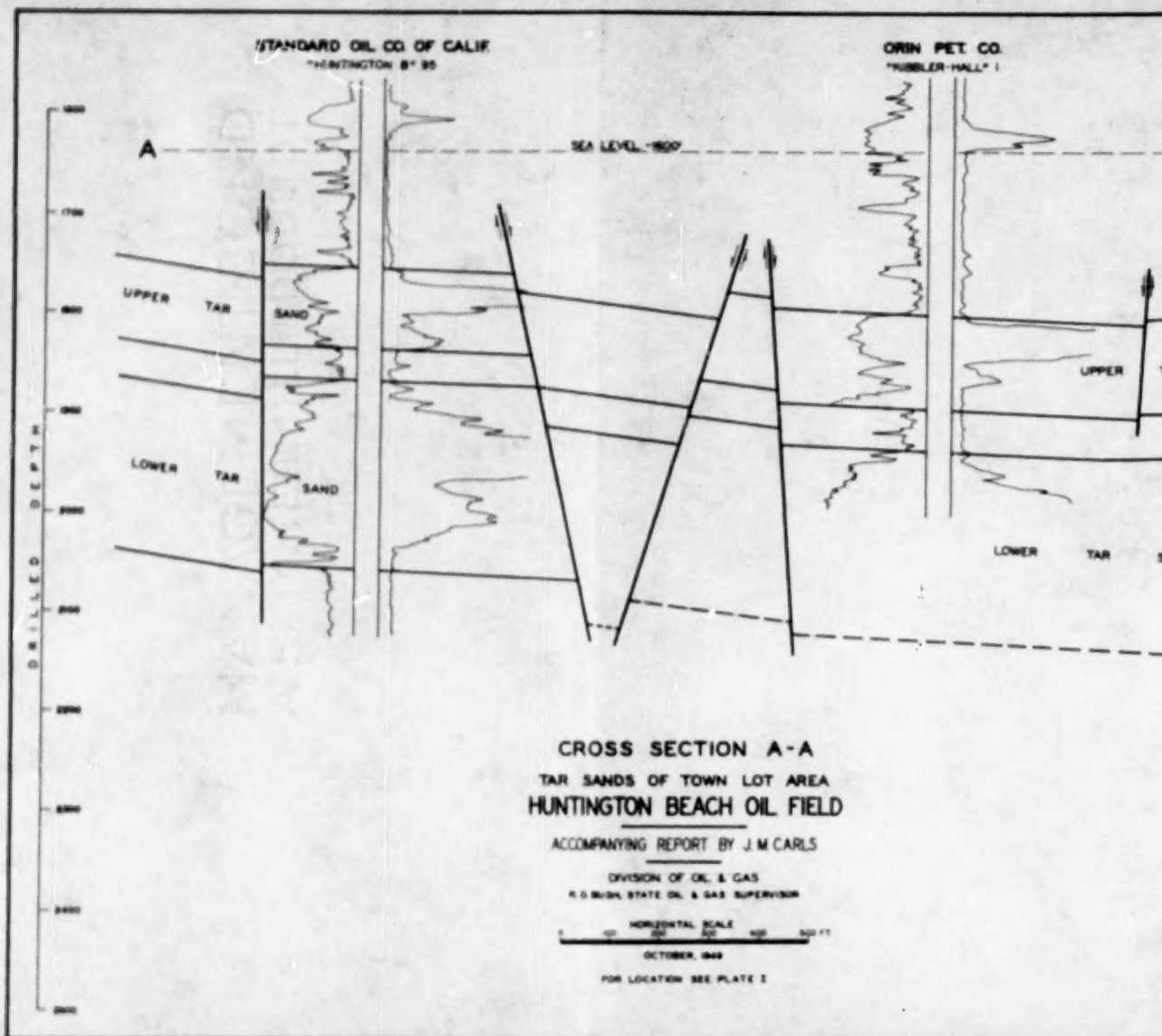
OCTOBER 1949

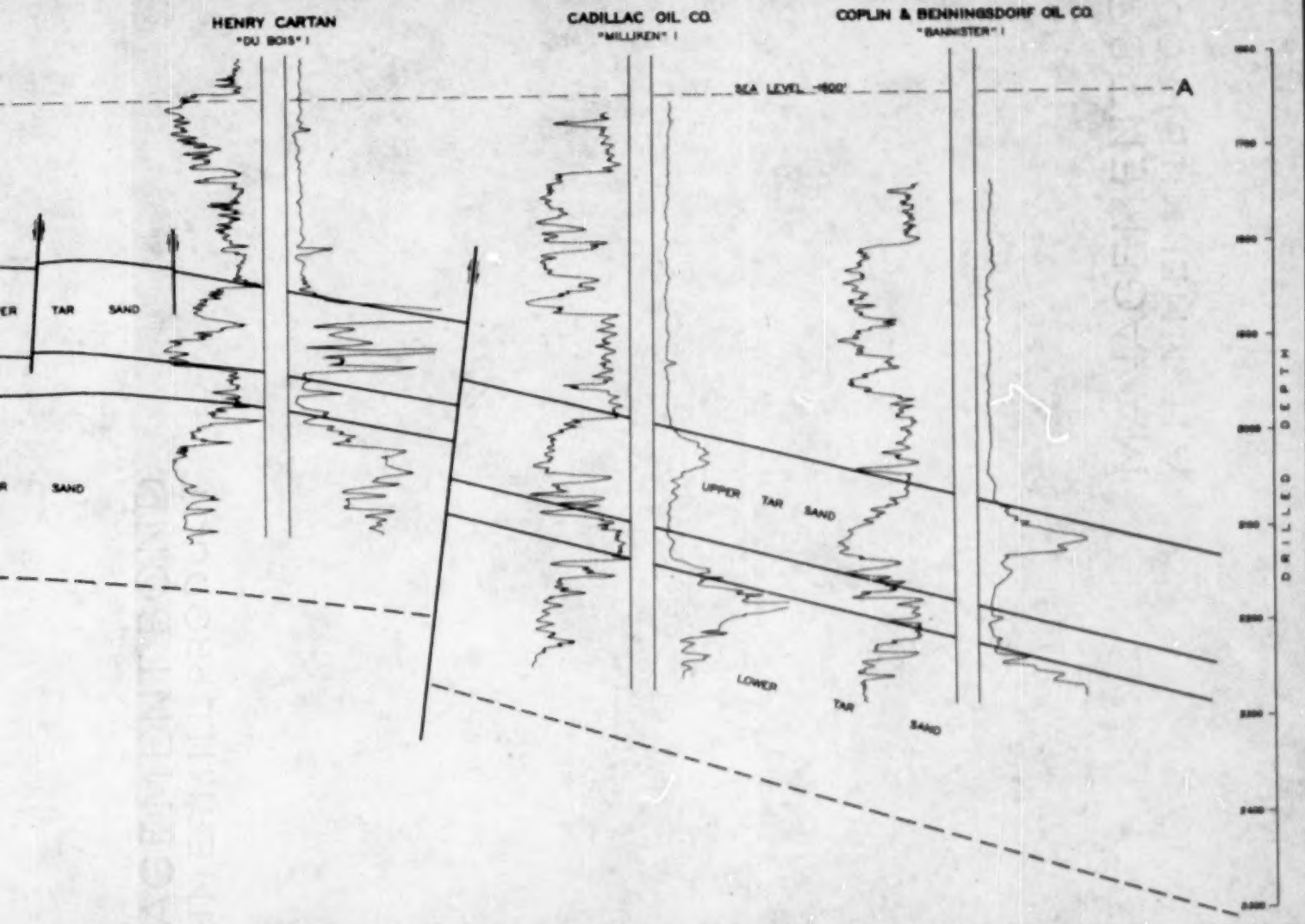
DATUM - SEA LEVEL
CONTOUR INTERVAL 10 FT.

- WELLS FROM WHICH CORRELATIONS WERE MADE.







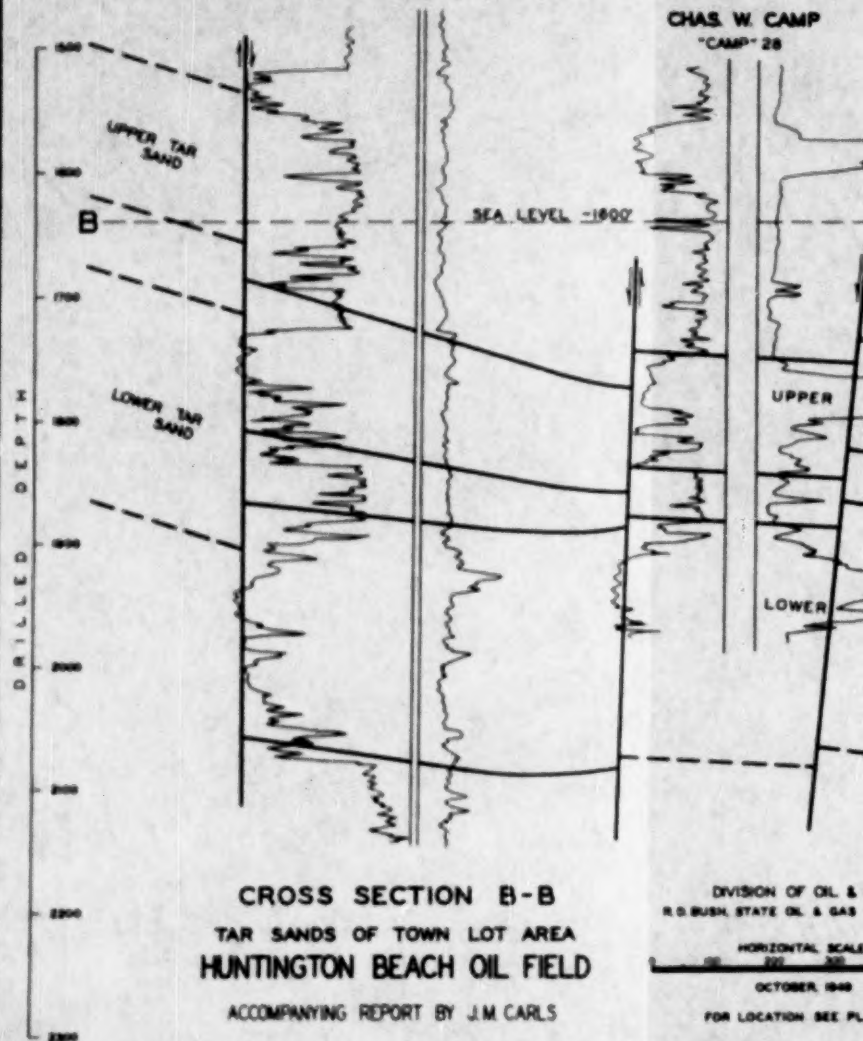


STANDARD OIL CO. OF CALIF.

"HUNTINGTON B" 76

CHAS. W. CAMP

"CAMP" 28



CROSS SECTION B-B
TAR SANDS OF TOWN LOT AREA
HUNTINGTON BEACH OIL FIELD

ACCOMPANYING REPORT BY J.M. CARLS

DIVISION OF OIL &
R.O. BUSH, STATE OIL & GAS

HORIZONTAL SCALE

0 100 200 300

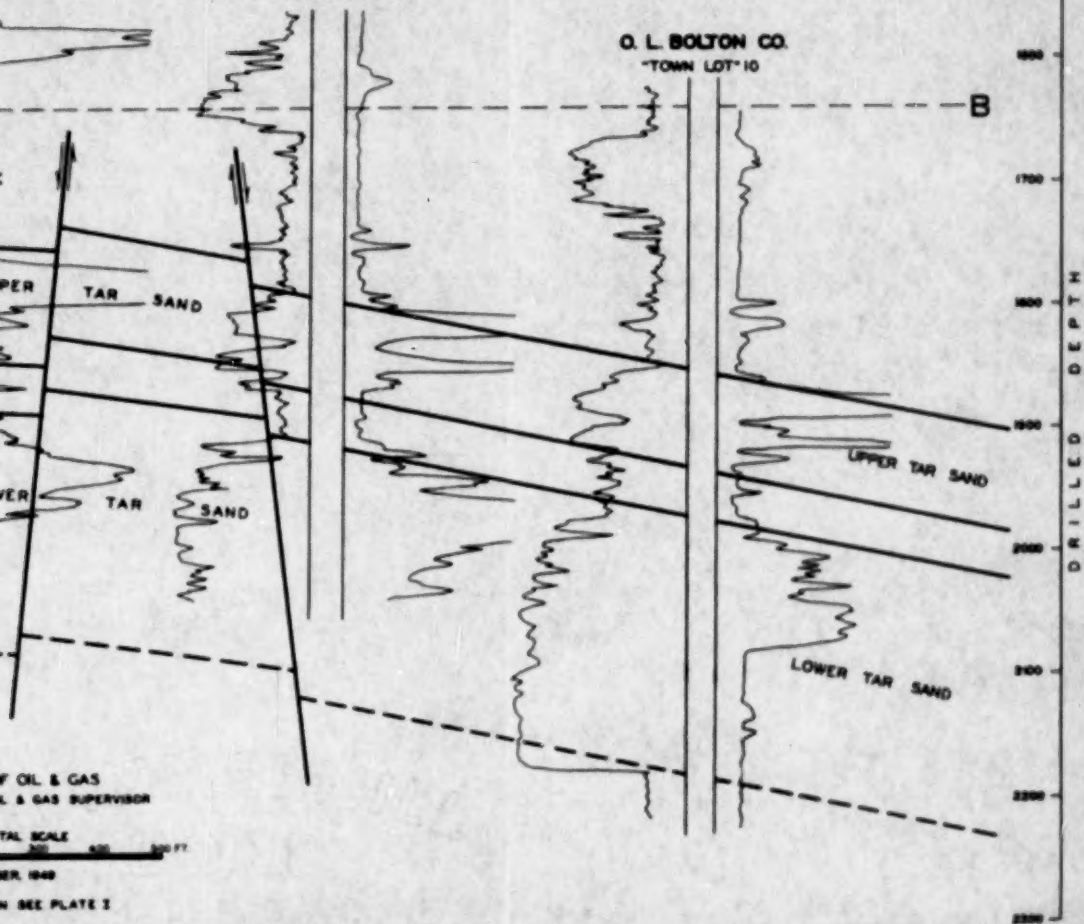
OCTOBER, 1949

FOR LOCATION SEE PL.

MP

STANDARD OIL CO. OF CALIF.
"HUNTINGTON H" 33

O. L. BOLTON CO.
"TOWN LOT" 10



ELECTRIC LOG
KIRBY HILL GAS FIELD
SHELL OIL CO. "LAURIE" 5
ACCOMPANYING REPORT BY RALPH G. FRANK

DIVISION OF OIL & GAS
KENTUCKY STATE OIL & GAS SUPERVISOR

SELF-RECORDING
LOGGING UNIT
NO. 100 87-1

RESISTIVITY
OHMS PER FT.

OF PENETRATION

IN

THE 10 COARSE GRAY SAND
WITH CONCENTRICALLY LAYERED
SANDS, SANDS, SANDS,
BEDDED WITH INTERBEDDED GRAY
SAND

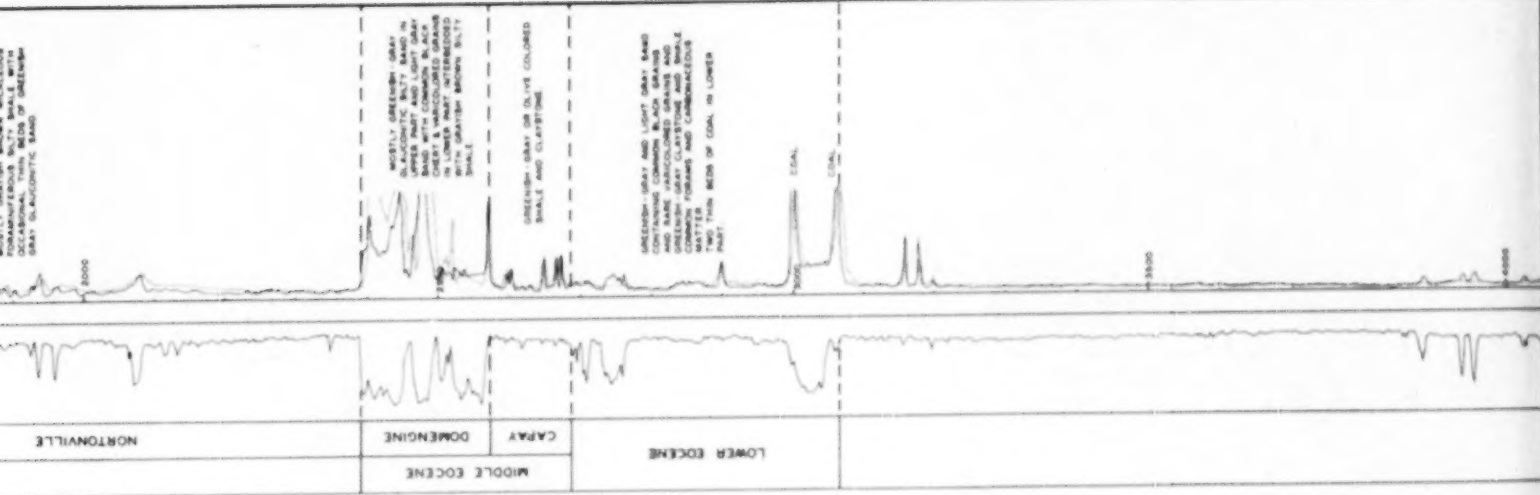
MOSTLY GRAYISH BROWN MICACEOUS
FORAMINIFEROUS SILTY SHALE WITH
OCCASIONAL THIN BEDS OF GREENISH
GRAY CLASTICITE SAND

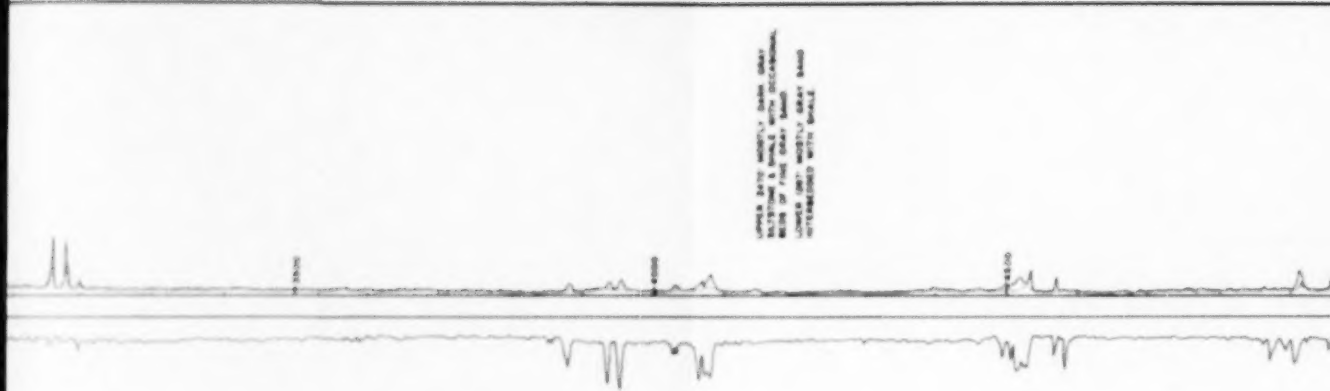
MARLEY

UPPER Eocene

FILE

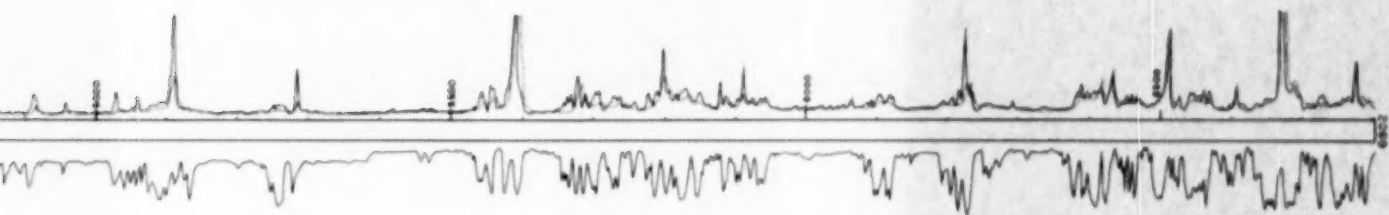
FORAMINIFEROUS BULY SHALE WITH
OCCASIONAL THIN BEDS OF GREENISH
GRAY SLAUGONITE SAND





LOWER 1/2" MOSTLY DARK BAND
 INTERFERED BY BAND WITH OCCASIONAL
 BAND OF FINE DARK BAND
 LOWER 1/2" MOSTLY DARK BAND
 INTERFERED WITH BAND

VACUOUS



CRETACEOUS

Subsequent to a judgment of the Superior Court in favor of the defendants the case was appealed to the Supreme Court of the State of California. During 1949 the Supreme Court ruled that existing legislation did not provide grounds to sustain the action.

The theory of a cooperative plan for development of a structure as a unit is generally accepted as insuring the maximum recovery from the reservoir. The benefits of such a program have been demonstrated in a number of California and Mid-Continent fields, from both an economic as well as the conservation viewpoint.

However there are many difficult problems to overcome in organizing a cooperative agreement of this nature and obtaining the unanimous consent of all interested parties to placing their respective properties under the control of a unit operating committee. The major point of difference appears to involve the relative value to be assigned to the individual parcels of land in determining the participants' shares in the reservoir as a whole.

GENERAL GEOLOGY

The Stratigraphic column, consisting of sediments ranging in age from Recent to Upper Miocene is approximately as follows:

Recent (feet)	
0-1000 Surface alluvium, sands, gravels, and clay.	
Pleistocene	
1000-4400 Sands and clay (Tulare)	
Pliocene	
4400-5900 Clays and occasional sand lenses (San Joaquin Clay)	
5900-8800 Fine to coarse grained gray sands alternating with shale; siltstone predominates in lower portion (Etchegoin-Jacalitos).	
Upper Miocene	
8800-9000 Gray siltstone (Reef Ridge)	} (McClure)
9000-9900 Grayish brown shale with streaks of chert in lower 300'	
9900-10,000 Chert	
10,000-13,000± Alternating sands and shale, the top 400'-800' containing the productive Paloma sands	} (Stevens)

Water wells drilled to a depth of 1200 feet have resulted in fresh artesian flow and, judging from electric log characteristics, the gradation to saline fluids occurs at about 2500 feet. The stratigraphic section is similar to that in the Ten Section and Coles Levee fields, the producing horizon referred to as the "Paloma" sand being approximately equivalent to the Stevens sand in those fields, although encountered at a greater depth.

The structure is an elongated dome with a northwest-southeast trend, the productive limits extending about eight miles along the major axis with a maximum width of nearly two miles. Correlation in the dry gas area shows that the structural high near the top of the Pliocene formation is approximately two miles westerly of the crest of the structure at the Stevens zone. Although some faulting is believed to be present, it does not appear to be a dominant factor in the accumulation. The apparently limited displacement together with the wide well-spacing makes the determination of faulting somewhat uncertain. However, there is considerable evidence to indicate that lenticularity and changes in permeability in the Paloma sands do affect the accumulation in the reservoir and the producing characteristics of the wells.

The electrical log marker "MM", occurring in the Miocene shale about 300-500 feet above the Paloma sand, was chosen as the correlation point in preparation of the contour map shown on Plate I. Contouring on this point, which is fairly consistent throughout the field, is believed to afford a relatively true structural picture although not accurately reflecting the position of the producing horizon. The interval between the MM marker and the Paloma zone is variable, apparently due to depositional changes. Along the southwest side of the axis both the volume and the permeability of the sands decrease. On the southeasterly plunge the sand thickens and even replaces a portion of the immediately overlying cherts, accounting for the maximum interval of 840 feet open to production in well No. "Paloma Unit" 38-1, Sec. 1, T. 32 S., R. 26 E.

The Symons zone, a sand body in the shale overlying the Paloma sand, likewise occurs in this area, as shown on cross-section A-A, Plate II.

In some places along the northeast flank, the upper portion of the Paloma sand has been found to contain water; and it has been necessary to effect a shut-off 100 to 200 feet below the top of the zone. However, a number of wells situated high structurally, particularly on the southwest of the axis, have also found salt water in the zone and been abandoned or effected only mediocre completions. Illustrations of this condition are The Ohio Oil Company wells No. "KCL-A" 61-31, "KCL-A" 8, and Union Oil Company of California well No. "Morgan" 81-14, shown in the cross-sections on Plates II, III, and IV, respectively. The possibility of a tilted water table of such magnitude does not seem logical, but the conditions can be explained by lenticularity and/or permeability barriers. In several other instances water is present in sands from the apparent equivalent of which clean production is obtained at lower structural positions, and there are also some discrepancies in gravity and gas-oil ratios from a structural standpoint.

Although the values vary over the field, the permeability of the producing zone appears to range between 50 and 100 millidarcys, occasionally reaching 300 millidarcys, and the porosity 20 per cent.

DEEP TESTS

In one of the early wells in the field, now "Paloma Unit" 74-3, Sec. 3, T. 32 S., R. 26 E., the operator prospected ahead to 11,216 feet. The lower formations not appearing productive, the hole was plugged to 10,700 feet and the well completed between that depth and the top of the Paloma sand at 10,075 feet.

During the latter part of 1948, The Superior Oil Company drilled well No. "Anderson" 56-35, Sec. 35, T. 31 S., R. 26 E., to a depth of 14,486 feet. A series of swabbing tests showed a negligible entry of fluid from the sands below 13,050 feet. The well was then completed in the Paloma zone from 11,520 feet to 11,983 feet.

In the most recent deep test, The Ohio Oil Company well No. "KCL-A" 61-31, Sec. 31, T. 31 S., R. 26 E., the operator encountered the top of the first Stevens sand at 10,222 feet and drilled ahead to 12,995 feet, the stratigraphic penetration being estimated as equivalent to that in The Superior Oil Company well. The sand intervals below the Paloma zone showed an average permeability of only one to three millidarcys, precluding the possibility of commercial production. Although well No. "KCL-A" 61-31 was situated high on the structure, as shown on Plate I,

salt water with a small amount of oil was recovered during tests in the Paloma zone, and the well was abandoned.

According to available information, it is believed that both of these recent deep tests reached the *Pulvinulinella Gyroidinaformis* zone, which is considered to mark the base of the Stevens zone.

TECHNOLOGY

The requirement for cementing surface casing to at least 1200 feet is for the purpose of protecting the known fresh water deposits. This casing also provides an adequate anchor for the installation of the necessary blowout prevention equipment. During the early development, a common procedure was to drill to the intended total depth and cement a full string of casing at that point. The casing was then gun-perforated above the zone for a test of shut-off and opposite the desired intervals in the Paloma sand for production.

Following a study of the advantages of oil-base drilling fluid over water-base fluid in relation to reservoir conditions in the Paloma sand, it has become standard practice to cement conventional water strings above the zone and change over to oil-base drilling fluid before penetrating the productive horizons. A completion is then effected by landing a perforated liner, or in cases where zonal segregation is desired or imperative because of intermediate water, a solid or combination liner is cemented.

The usual program now provides for 1200 feet of 13 $\frac{3}{8}$ -inch surface casing, a 7-inch water string at 10,000 feet plus, and a 5-inch liner. In approximately one-half of the total wells drilled by the Unit Operator oil-base fluid has been used. It is also reported that coring with diamond core heads has found much application because of favorable drilling speed and increased core recoveries.

PRODUCTION

As of June 30, 1949, there had been 147 wells drilled into the oil measures in Paloma field. Of this number, 135 were completed to production, including 6 in the Symons sand, and 12 abandoned. Sixteen of the wells in the Paloma zone were currently being used for gas injection purposes by the Unit Operator. The cumulative oil production as of June 30, 1949, was 22,672,068 barrels, the gravity ranging from 30 to 61-degrees. The total cumulative production from the upper dry gas zones was 5,031,020 Mcf. From the oil zones a gross total of 127,569,943 Mcf. of gas had been produced of which 82,614,896 Mcf. was injected back into the Paloma zone, leaving a net withdrawal of 44,955,047 Mcf.

November, 1949.

RECENT DEVELOPMENTS IN THE TAR SANDS OF THE TOWNLOT AREA, HUNTINGTON BEACH OIL FIELD

By J. M. CARLS¹

From the latter part of 1947 through the early part of 1949 the Tar sands of the townlot area of the Huntington Beach oil field were intensively developed. A report by S. G. Dolman² gives the history of the discovery and earlier development of these sands.

The primary purpose of this report is to present the following: a contour map showing the top of the Upper Tar sand (Plate I); a contour map showing the top of the Lower Tar sand (Plate II); an east-west cross section which passes through the eastern and western areas of production (Plate III); a cross section at the western edge of the townlot area which parallels the dip of the Tar sands (Plate IV); a table of production statistics giving a breakdown of production for the two distinct producing areas (Table I).

The increase both in demand and price for low-gravity crude oil during 1946 and 1947, renewed interest in the Tar sands of Huntington Beach. In April 1947, O. L. Bolton completed well No. "Mize" 1, in Block 420 of the townlot area in the Upper Tar sand with an initial production of 60 barrels per day of 13.5 degrees gravity oil. This started an intensive drilling campaign which resulted in the completion of 136 new wells in the Tar sands up to April 1, 1949.

GEOLOGY

The townlot area in Sec. 10, T. 6 S., R. 11 W., S. B. B. & M., is on the northerly flank of an elongated dome which is the structural feature of the Tideland pool of the Huntington Beach oil field. The productive area of the Tar sands is limited on the south by an east-west fault which, in part, falls along Olive Avenue. Several wells were drilled south of this fault but found the Tar sands to be wet. A north-south fault which intersects the Olive Avenue fault at 16th Street and Olive Avenue divides the townlot area into two distinct producing areas, differentiated in Table I as the western and eastern areas. Considerable faulting occurs in the southwest corner of the western area. The dip of the Tar sands in the western area is slightly east of north and, in the eastern area, approximately northeast.

Wissler³ states that the Tar zone is equivalent to the Bolsa zone of the old field. This zone is, for the most part, in the Upper Repetto formation of Pliocene age. "Old field" refers to the area north and west of the townlot area from which the first oil was produced in the Huntington Beach field.

In the western area the Upper Tar sand is reached at sub-sea depths of from 1,660 to 1,960 feet; the Lower Tar sand, from 1,810 to 2,090 feet. In the eastern area the Upper Tar sands ranges from 1,860 to 2,060 feet below sea level; the Lower Tar sand, from 2,020 to 2,220 feet. Drilled depths are approximately 40 feet greater than the foregoing figures. The Upper Tar sand varies in thickness from 80 to 110 feet; the intervening shale, from 30 to 50 feet; and the Lower Tar sand, from 180 to 210 feet.

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² Summary of Operations, California Oil Fields, Vol. 13, No. 12.

³ Stratigraphic Formations of the Producing Zones of the Los Angeles Basin Oil Fields; Calif. State Division of Mines, Bulletin 118.

Two of the new wells in the productive portion of the townlot area were drilled into the Jones sand which is a productive sand in the Tideland pool. These wells were located in Blocks 322 and 622. Neither well found the Jones sand commercially productive. The electric logs of these wells showed the top of the Jones sand approximately 1,200 feet below the top of the Upper Tar sand.

TECHNOLOGY

No outstanding difficulties were encountered in the drilling of the wells. Most of the development was accomplished with light, portable-mast rigs.

The usual casing program consisted of a 30- to 40-ft. conductor pipe; an 8½-in. water string set at the top of the sand to be produced; and a 6½-in. perforated liner through the oil sand. Most of the wells were gravel packed after the liner was set. The Division of Oil and Gas required that sufficient cement be pumped around the shoe of the 8½-in. casing to reach to the surface.

In some of the wells completed to produce from both the Upper and Lower Tar sands, the shale body between the sands was believed to contain thin streaks of water sand. In the early wells these water sands were shut off by the cementing of a blank section of casing opposite the shale body prior to the running of the water string. The water string and the blank section were the same size, and the water string was landed and cemented at the top of the Upper Tar sand. A liner with perforations opposite both sands was then landed at the base of the Lower sand.

Another method was used in later wells. After the well had been drilled to the completion depth in the Lower Tar sand a casing string was run into the hole which consisted of a solid steel casing from the surface to the top of the Upper Tar sand; a solid Securaloy casing from the top to the base of the Upper Tar sand; and a solid steel casing from the base of the Upper Tar sand to the top of the Lower Tar sand. To facilitate its subsequent removal Securaloy of an outside diameter less than the inside diameter of the casing above was used. Sufficient cement was pumped around the shoe of the string at the top of the Lower Tar sand to reach to the surface. The cement inside the casing was usually displaced to the bottom of the Securaloy section. After the customary shutoff test had been made through shot holes at the top of the Upper Tar sand, the Securaloy section and the cement in the steel section were then drilled out. The hole was cleaned out to bottom and the intervals opposite the Upper and Lower Tar sands were wall-scraped to the desired diameter. A liner was run with perforations opposite the Upper and Lower Tar sands. In most of the wells the liner was gravel-packed after it had been landed, but in some a prepacked liner was landed.

PRODUCTION

The initial production rates of the wells ranged from 10 to 100 barrels a day, and the initial water cuts, from 2 to 90 percent. The new wells in the Tar sand of the townlot area produced a total of 1,166,832 barrels of oil by April 1, 1949. Of this total, the western area produced 818,394 barrels and the eastern area, 348,438 barrels. The oil is asphaltic base, and the gravity ranges from 12.5 to 14 degrees A.P.I.

TABLE 1
PRODUCTION STATISTICS
NEW TAR ZONE WELLS
TOWNLOT AREA, HUNTINGTON BEACH OIL FIELD
April 25, 1947, to April 1, 1949

PART 1
WESTERN AREA
(Production Totals for Periods of Three Months)

Period	Wells in Upper Tar Zone			Wells in Lower Tar Zone			Multiple Zone Wells to Upper and Lower Tar Zones		
	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day
1947—April to June..... July to September..... October to December.....	3,338 12,230 15,060	5 7 12	15 20 18	405 7,915 9,949	1 4 5	22 24 22	856 28,238 73,313	1 16 32	87 37 23
1948—January to March..... April to June..... July to September..... October to December.....	24,153 25,587 26,301 19,466	18 22 21 20	16 15 14 11	7,919 6,920 4,967 3,998	8 3 5 6	18 15 11 8	103,679 128,214 106,731 92,491	53 62 67 67	27 26 18 15
1949—January to March.....	19,460	20	11	3,993	6	7	79,024	67	13

PART 2
EASTERN AREA

Period	Wells in Upper Tar Zone			Wells in Lower Tar Zone			Multiple Zone Wells to Upper and Lower Tar Zones		
	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day	Oil (Bbl.)	Number of Producing Wells	Average Production Per Well Per Day
1947—April to June..... July to September..... October to December.....	1,314	1	14	2,123	2	23	10,802	7	37
1948—January to March..... April to June..... July to September..... October to December.....	791 782 530	1 1 1	9 9 6	21,370 53,584 44,253 37,053	14 27 18 27	34 27 18 15	27,563 28,737 30,863 28,252	12 14 15 15	30 26 22 21
1949—January to March.....	484	1	5	34,367	27	14	25,196	15	10

PRELIMINARY REPORT ON KIRBY HILL GAS FIELD

By RALPH G. FRAME¹

INTRODUCTION

The Kirby Hill Gas field, as of July 1, 1949, ranked fourth in gas production among the Northern California gas fields. During the six-month period January to June, inclusive, 1949, the field produced 1,932,618 Mef. of gas. Only the production of Rio Vista, McDonald Island and Thornton Gas fields, in the order given, exceeded the above figures.

The Kirby Hill Gas field is located in Solano County, about 12 miles due west of the town of Rio Vista, 8 miles southeast of Fairfield, and 7 miles north of the mouth of the Sacramento River.

Only two companies, Shell Oil Company and Standard Oil Company of California, have production in the field. The proved acreage as of July 1, 1949, was conservatively estimated as 730 acres. In June 1949, the field was producing gas at the rate of 9,991 Mef. per day. The gas is relatively high in calorific value and varies from 955 to 1037 B. T. U. per cubic foot. The specific gravity of the gas varies from .570 in the higher zones to .605 in the deeper sands.

HISTORY AND DEVELOPMENT

The presence of gas in the Kirby Hill field was first established by Shell Oil Company, on September 5, 1944, when well No. "Lambie" 1, Sec. 25, T. 4 N., R. 1 W., M. D. B. & M., suddenly blew out. The blow-out occurred while 5½ inch casing was being run into the hole. The blow of relatively clean dry gas was estimated to be 15,000 Mef. per day. Several days later, after having had a total of 1042 sacks of cement and Calseal pumped into it, the well was brought under control. However, the 5½ inch casing was found to be frozen at 2287 feet and also damaged by the blow-out; so the well was plugged and abandoned. The total depth was 2617 feet. The electric log indicated that some 250 feet of dry gas sand interbedded with shale was present in the interval 2063 to 2368 feet. This sand was later determined to be Domengine of Middle Eocene age.

The first successful completion was Shell Oil Company well No. "Lambie" 1A, drilled about 150 feet northwesterly from "Lambie" 1. "Lambie" 1A was completed from a depth of 2318 feet on January 10, 1945 and flowed clean gas at the rate of 3980 Mef. per day through a ½" bean. The shut-in pressure was 1128 lb. Only the bottom 28 feet of gas sand, from 2289 to 2317 feet, was perforated for the test.

Subsequent drilling has shown that, due to faulting and unconformity, the productive limits of the field are very irregular. Of seventeen wells that have been drilled within the established field boundary, nine secured gas production and eight were abandoned as dry holes. These dry holes completely encircle the field, and further extension of the productive limits is not expected. Exploration and development of the field was completed by the end of 1948.

GEOLOGICAL DATA

The structure of the Kirby Hill Gas field appears to be a rather long narrow anticline, considerably altered by a complex fault pattern. The

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parallel to the Kirby Hill fault. Enough data are not yet available to justify the drawing of a contour map or cross-section. In many of the wells, sufficient diagnostic fauna were not found to make certain the identity and age of some of the beds. Furthermore, with insufficient wells in any one fault block to interpret the structure properly, a contour map or cross-section would only be misleading.

Although other unconformities undoubtedly exist in this field, the most noticeable one occurs at the base of the Domengine. In Standard Oil Company of California wells No. "Kirby Community" 2 and 4, beds of Cretaceous age are reported directly below the Domengine, whereas in one other well, Shell Oil Company, "Lambie" 6, about 4475 feet of Middle or Lower Eocene (Capay, Meganos and Martinez) strata intervene between the Domengine and Cretaceous. A considerable part of the drilled thickness of 4475 feet may be due to steeply dipping beds. In other wells in the field, variable amounts of these beds occur above the Cretaceous. Such a great variation in the section suggests considerable uplifting of some areas followed by long periods of erosion before the Domengine sand was deposited.

The Kirby Hill Gas field contains two separate structurally high areas, believed to be separated by a cross fault. For the sake of convenience, throughout this paper the high area in the northwest end of the field will be called the Kirby Community area and the one in the southeast, the Lambie area.

As of December 31, 1948, gas has been found and produced from sands of the following geological ages: Upper Eocene (Nortonville), Middle Eocene (Domengine), Middle or Lower Eocene (Meganos), Lower Eocene (Martinez) and Cretaceous. At the present time there is no general agreement as to which part of the Lower Eocene to classify as Meganos and which part as Martinez. In some other areas within the State, in fact, the Martinez formation has been placed in the Paleocene (a transition stage between the Cretaceous and Eocene).

STRATIGRAPHY

Within the productive limits of the field, the formations encountered by the bit, from the surface down are:

- Markley (Upper Eocene)
- Nortonville (Upper Eocene)
- Domengine (Middle Eocene)
- Capay (Middle Eocene)
- Meganos (Middle and Lower Eocene)
- Martinez (Lower Eocene or Paleocene)
- Cretaceous (Exact age not determined).

Due to unconformity and faulting, stratigraphic correlations throughout the field and particularly below the Domengine sand are very difficult and sometimes impossible to establish. For instance, a well-developed sand body about 350 feet thick, considered by some geologists to be of Meganos age and occurring in the Kirby Community area is not present at all in the Lambie area. Rather than attempt a very generalized description of the stratigraphy throughout the whole field, the writer will

confine himself to a brief description of the strata encountered in one well in each area, namely: Standard Oil Company of California "Kirby Community" 3 in the Kirby Community area and Shell Oil Company "Lambie" 5 in the Lambie area. It should be noted, however, that in other wells, the formations here described may be thicker or thinner or even entirely absent. The stratigraphic section penetrated by "Kirby Community" 3 is as follows:

<i>Drilled Depth</i>	<i>Thickness</i>	<i>Formation</i>	<i>Description</i>
0'-940'	940'	Markley ----- (Upper Eocene)	Fine to coarse gray sand with characteristic large mica flakes common, interbedded with brownish-gray shale.
940'-1547'	607'	Nortonville ----- (Upper Eocene)	Mostly grayish-brown micaceous foraminiferous silty shale with occasional streaks of greenish-gray glauconitic gray sand.
1547'-1710'	163'	Domengine ----- (Middle Eocene)	Mostly greenish-gray glauconitic silty sand in upper part and light gray quartz sand in lower part, interbedded with grayish-brown micaceous silty shale.
1710'-1850'	140'	Domengine ----- (Middle Eocene)	Mostly brown silty shale with streaks of sand and lignite. May include some Meganos or Martinez shale at base.
1850'-2197'	347'	Meganos (possibly ----- Martinez) (Middle and Lower Eocene)	Mostly fine to medium-grained greenish-gray quartz sand with thin beds of gray micaceous silty shale.
2197'-3460'	1263'	Martinez ----- (Lower Eocene)	Principally greenish-gray silty shale with thin beds of greenish-gray quartz sand.

The description of the above strata has in some cases been supplemented by core descriptions taken from other well records of the same interval.

The sequence of stratigraphy as encountered in Shell Oil Company "Lambie" 5 in the Lambie area is as follows (See Plate II):

<i>Drilled Depth</i>	<i>Thickness</i>	<i>Formation</i>	<i>Description</i>
0'-1615'	1615'	Markley ----- (Upper Eocene)	Same as for "Kirby Community" 3 described above.
1615'-2390'	775'	Nortonville ----- (Upper Eocene)	Same as for "Kirby Community" 3 with slightly more sand present.
2390'-2570'	180'	Domengine ----- (Middle Eocene)	Grayish-green glauconitic sand in upper part and light gray sand with common black chert and varicolored grains in lower part, interbedded with grayish-brown silty shale.
2570'-2675'	105'	Capay ----- (Middle Eocene)	Greenish-gray or olive colored shale and claystone.

<i>Drilled Depth</i>	<i>Thickness</i>	<i>Formation</i>	<i>Description</i>
2675'-3065'	390'	Lower Eocene	Greenish-gray and light gray sand containing common black grains and rare varicolored grains and greenish gray claystone and shale, common forams and carbonaceous matter, two thin beds of coal in lower part.
3065'-6802'	3737'	Cretaceous	Upper 2470' mostly shale with occasional beds of sand and lower 1267' mostly sand interbedded with shale.

PRODUCTIVE ZONES

At the present time, gas in the Kirby Hill Gas field is or has been produced from seven separate zones. Three of these zones occur in the Nortonville, Domengine and Meganos formations, respectively; three in Lower Eocene sands and one in the Cretaceous. A brief description of each zone follows:

Nortonville Zone

Only one well, Shell Oil Company "Wagenet" 1, is producing from a gas sand in the Nortonville in the interval 2260-2280 feet, but a formation test showed gas to be present in Standard Oil Company of California well No. "Kirby Community" 1 from 1270 to 1280 feet. The maximum thickness of the sand is about 20 feet and the original shut-in pressure was 1100 lb. This zone is considered of minor importance as a gas reserve.

Domengine Zone

Four wells are currently producing from sands of Domengine age, and this formation is the principal source of gas in the field. The four producing wells are Standard Oil Company of California "Kirby Community" 3, "Fontana Farms" 4 and Shell Oil Company "Lambie" 1A and "Wagenet" 1. The Domengine sand is cemented off behind the casing in two other wells, Shell Oil Company "Lambie" 5 and Standard Oil Company of California "Kirby Community" 1. The net amount of gas sand present in the wells varies from 85 to 250 feet. One interesting feature in the field is that 210 feet of Domengine sand in one well, Shell Oil Company "Lambie" 2, although located structurally higher than any of the other productive Domengine sands in the Lambie area, nevertheless was barren. This was attributed to extremely low permeability of the sand. The nature of the gas produced from the Domengine sand varies according to its location in different fault blocks and consists of from 92 to 98 percent methane, one-half to three percent ethane, $1\frac{1}{2}$ to 3 percent nitrogen and usually small amounts of carbondioxide, propane and butane.

Meganos Zone

Below the Domengine sand in the Kirby Community area occurs from 90 to 140 feet of grayish brown micaceous silty shale thought to be of Domengine age. Beneath this shale occurs a sand body containing a maximum of 240 feet of gas sand which has been identified as Meganos formation. Two wells, Standard Oil Company of California "Kirby Community" 1 and "Kirby Community" 5, are currently producing from this zone and the gas sand is cemented behind the casing in one other well,

"Kirby Community" 3. The gas is predominately methane with about 1½ percent nitrogen and one percent ethane present. A remarkable thickening of the Meganos sand occurs from well No. "Kirby Community" 1 northwesterly to "Kirby Community" 5, a distance of about one-half mile. The total sand thickness increases from 290 feet in the first well to 625 feet in the second well. Of course, part of this increased thickness may be due to steeper dips. In the latter case, unfortunately, only the top 125 feet is dry gas sand above the water table located at 2463 feet subsea.

Lower Eocene Zones

In the southeastern half of the field, three wells were drilled by Shell Oil Company in which no gas sands were found in the upper zones but production was secured from strata of Lower Eocene age. In "Lambie" 3, twenty feet of gas sand was located at 2855 to 2875 feet but the supply of gas proved to be minor. The shut-in surface pressure dropped from 1950 to 1050 lb. after the production of approximately 34,000 Mcf. Fifty feet of gas sand was found in "Lambie" 2 in the interval 3068 to 3138 feet. This zone also failed to fulfill expectations, and after about a year of steadily declining production the well started to produce water and production soon became negligible. The third and deepest zone in the Lower Eocene was found in well No. "Wagenet" 2. About 235 feet of productive gas sand was encountered in the interval 5400 to 5660 feet. The gas production in this zone has been consistent, averaging between three and four million cubic feet per day; the pressure has held up well, and the major part of the Lower Eocene gas reserve is undoubtedly in this zone. The original formation pressure was 2669 lb. absolute which dropped to 2408 lb. after nearly one and one-half million Mcf. of gas had been produced.

The areal extent of the gas sand is unknown as only one other well, Shell Oil Company "Lambie" 6, about 3000 feet southeasterly from "Wagenet" 2, has penetrated the zone. The sand, however, was encountered 485 feet lower and was found to be wet. Considerable difference is noted in the kind of gas produced from the three wells in Lower Eocene strata. For example, the gas from "Wagenet" 2 contains 8.2 percent nitrogen, whereas only 1.0 percent of nitrogen was present in the gas from "Lambie" 2 and none at all was noted from "Lambie" 3. The percent methane is correspondingly low in "Wagenet" 2, being only 90.2 percent as compared to 95.1 percent in "Lambie" 2 and 97.7 percent in "Lambie" 3. Variable percentages of ethane and propane occur in all three wells.

Cretaceous Zone

Only one well in the field; namely, Shell Oil Company "Lambie" 5, is believed to be producing from sands of Cretaceous age. Approximately forty feet of gas sand was located by means of the electric log in the interval 5535 to 5600 feet. Subsequent production has shown that the gas reserve is of minor importance. The formation pressure, absolute, dropped from 3915 to 1485 lb. after a production of about 40,000 Mcf. of gas. The gas also contains a relatively high percent (5.0) of nitrogen. The other constituents were: methane 92%, ethane 2%, and propane 1.0%. It is of interest to note the abnormally high original formation pressure of 3915 lb. at a midpoint depth of 5567 feet in "Lambie" 5 as compared to 2669 lb. at a midpoint depth of 5530 feet in "Wagenet" 2.

PRODUCTION AND RESERVES

Following the completion of pipe line installations, commercial deliveries of gas from the Kirby Hill Gas field commenced in February 1947. As of July 1, 1949, the field had produced a total of 8,616,599 Mcf. of gas. In the opinion of the writer, sufficient data are not yet available to make an accurate estimate of the gas reserves. However, a figure has been arrived at which he believes to be the best that can be had at the present time, taking into consideration the age of the field (2 years) and the present available data.

In considering the best method of estimating the gas reserves, it was ascertained that insufficient data on porosity, interstitial water, productive limits and location of the water table were available to make the volumetric method feasible. Furthermore, the field has not had a sufficient time interval of production to make possible the use of a decline curve. It was therefore decided that the only practicable method to use at the present time was the volumetric-pressure drop method explained in an article by the writer accompanying a re-estimate of the Rio Vista Gas field reserves.¹

As stated in a previous paragraph, it is the consensus among engineers familiar with the Kirby Hill Gas field that probably no two wells are producing from the same gas zone in the same fault block. It was necessary, therefore, to compute the reserve for each well. The results were tabulated by zones and added to give the field total. Calculations were made for two separate time intervals of production from all but two of the gas pools and the results averaged to give the final figures. For two wells, sufficient data were available to make only one calculation of the gas reserve. The tabulation of the gas reserves by zones follows:

Nortonville	342,000 Mcf.
Domengine	24,502,000 Mcf.
Meganos	10,341,000 Mcf.
Lower Eocene	13,942,000 Mcf.
Cretaceous	108,000 Mcf.
Total gas in place	49,235,000 Mcf.
Total recoverable reserve at 85% recovery	41,849,750 Mcf.
Total gas production to July 1, 1949	8,616,599 Mcf.
Total recoverable reserve as of January 1, 1949	33,233,151 Mcf.

WATER CONDITIONS

The position of the water table in the productive zones, particularly the Domengine, is quite variable. In Standard Oil Company of California well No. "Kirby Community" 5, the electric log indicated the top of the Domengine sand to be wet at 2112 feet subsea. In Shell Oil Company well No. "Lambie" 5, the top of the water table was located at 2180 feet subsea. In contrast to the two wells mentioned above, the water table in Shell Oil Company well No. "Wagenet" 1 was located at a depth of 2480 feet subsea. The variations in the position of the water table are probably due to several factors including tilting and faulting after the original accumulation of the gas had occurred. Portions of the field which were originally down structure and wet may have been elevated above the gas bearing strata by subsequent faulting, the original reservoir fluids remaining entrapped.

¹ Summary of Operations—California Oil Fields, Jan.-June, 1948, Volume 34, No. 1.

The top of the water table in the Meganos sands also varies considerably. Although only two wells, Standard Oil Company of California "Kirby Community" 3 and "Kirby Community" 5 have penetrated bottom water in the Meganos zone, the electric log indicates the sand to be wet at 2107 feet subsea in "Kirby Community" 3 and at 2460 feet in "Kirby Community" 5.

One of the Lower Eocene wells, Shell Oil Company well No. "Lambie" 2 has recently begun to produce considerable water with the gas and is now shut in. Similarly, the only well in the field believed to be producing from the Cretaceous, Shell Oil Company "Lambie" 5, started to produce excess water and has also been shut in.

All other wells in the field are still producing clean gas free from water other than the normal amount of water vapor sometimes present in natural gas.

DRILLING PRACTICE

Great care and diligence were required to prevent blow-outs in the drilling of wells in the Kirby Hill Gas field. Maintaining the proper weight and viscosity of the drilling fluid was undoubtedly the most important phase of drilling operations. The commonly stated maxim that the formation pressure of an oil or gas reservoir is approximately equal to the hydrostatic pressure at the depth of the reservoir, definitely does not apply to the Kirby Hill Gas field. In several wells, pressures were encountered from 800 to 1300 lb. above the normal hydrostatic pressure of water at that depth. Therefore, the weight of the drilling mud had to be checked constantly and kept between 110 and 120 lb. per cubic foot during most of the drilling. One well required the pumping in of mud weighing 140 lb. per cubic foot, in order to prevent its blowing out of control. However, due to the diligent supervision of those in charge of drilling operations, no well drilled after the discovery well, Shell Oil Company "Lambie" 1, ever got completely out of control.

Loss of circulation was occasionally experienced, probably when fractured strata were encountered. Circulation was usually regained without difficulty by reducing the mud weight or by pumping in fibrous material. The necessity of maintaining such heavy mud fluid to prevent blow-outs naturally increased the likelihood of losing circulation.

Adequate blow-out prevention equipment was of prime importance and usually consisted of two Shaffer gates in conjunction with either a Regan or Hydril blow-out preventer. One of the Shaffer gates was equipped with drill pipe rams to pack off around the drill pipe when in the hole and the other Shaffer gate furnished a complete shut-off when the drill pipe was out of the hole. The Regan and Hydril blow-out preventers were designed to pack off around either the kelly, drill pipe, casing or tubing, whichever might be in the hole, and even to effect a shut-off when no pipe was in the hole. All wells were equipped with a high pressure mud fill-up line below the blow-out preventers. Prompt use of the above described blow-out equipment averted on many occasions disastrous blow-outs in the field.

The surface casing consisted of either 11 $\frac{1}{2}$ or 13 $\frac{1}{2}$ inch casing cemented at 500 to 550 feet, with sufficient cement to reach to the surface. After the hole was made, the electric log run and any desired side-wall samples taken, either 5 $\frac{1}{2}$ or 7 inch casing was cemented through

any possible gas sands. Four $\frac{1}{2}$ inch holes were then shot above the gas zone for a shut-off test, required by the Division of Oil and Gas. After a satisfactory test, the casing was gun perforated for production. In a few wells, it was found advisable to cement $9\frac{5}{8}$ inch casing in the Nortonville shale as an additional protection string.

The completion of a well was relatively simple. After the tubing was run, the "Christmas tree" and flow lines properly installed, circulation of the heavy mud fluid was established and water was then introduced into the system to lighten the mud column. In a short while the well started to flow.

CONCLUSION

Probably only a few more wells, if any, will be drilled in the Kirby Hill Gas field. The field is already encircled with abandoned wells and experience has shown the great risk involved in securing profitable production from very promising locations. Furthermore, gas reservoirs do not warrant the close spacing that is profitable in oil pools. Although the knowledge received from new drilling would be extremely helpful and even necessary to complete the structural picture, economic justification, rather than the securing of geological markers will govern future drilling.

The writer wishes to express his appreciation to the geological and drilling personnel of both Standard Oil Company of California and Shell Oil Company, Northern Division, who gave him wholehearted cooperation.

November, 1949

CORRECTION

Vol. 34, No. 2

Page 8, 4th paragraph, under "Land Subsidence," in line 3, 1948 should be substituted for 1947.

PRODUCTION STATISTICS OF CALIFORNIA OIL FIELDS

The accompanying statement, Table I, gives the segregated data of production of clean oil and water in the various oil fields of the State for the semiannual period closing June 30, 1949. These data are compiled by the field offices of the Division of Oil and Gas from the monthly production reports, giving the individual well productions, filed with the State Oil and Gas Supervisor by all producing companies.

The total production of the State for the first six months of 1949 was 171,396,449 barrels of oil and 253,476,111 barrels of water, a decrease compared with the production of the previous six months of 1,508,013 barrels of oil and an increase of 8,745,705 barrels of water.

Table II gives the average daily oil production and the average daily production and disposition of natural gas by fields monthly for the first six months of 1949.

Table III gives the estimate of the known gas reserves of the State as of January 1 and July 1, 1949. In a few fields new estimates have been made from those originally published in Vol. 28, No. 1 due to further study. They will continue to be amended in subsequent volumes of the "Summary" as additional data are obtained or new zones or fields discovered.

TABLE 1
PRODUCTION STATISTICS OF CALIFORNIA OIL FIELDS—JANUARY 1 TO JUNE 30, 1949

Field	Average number of producing wells		Oil (bbl.)	Water including water in solution (bbl.)	Cumulative production of oil (bbl.)	Production per well per producing day		Percentage of total wells produced	Proved average	
	Actual	Potential				Barrels			Percentage	As of June 30, 1949
						Oil	Water	Water		
Don. 1—Aliso Canyon.....	44	60	642,088	70,012	9,618,787	89.4	9.7	9.8	815	415
Beverly Hills.....	2	2	15,173	47,011	4,052,863	45.1	130.9	74.4	130.9	130
Brea-Ontario.....	428	571	2,778,152	1,983,237	261,871,626	37.1	28.8	41.6	1,564	1,714
Cerritos, East.....	234	241	1,053,368	1,001,927	80,800,291	27.5	33.9	55.3	1,260	1,430
Coyote, West.....	275	297	2,332,358	2,139,527	162,800,041	32.5	65.7	88.6	1,013	1,004
Del Valde.....	80	93	435,370	435,371	11,792,280	99.6	32.5	32.8	97.2	755
El Comodoro.....	34	38	2,297,407	2,585,292	1,198,421	39.0	44.2	52.8	1,220	1,220
El Segundo.....	1,452	1,323	10,824,638	6,865,426	427,745,553	53.4	133.0	38.8	3,330	3,752
Harbor Beach.....	361	340	2,934,742	5,990,660	188,008,112	40.4	198.7	70.5	945	870
Indiawood.....	12	15	173,200	53,602	1,360,922	94.4	126.4	87.6	1,180	1,328
Lanuda.....	1,112	1,242	4,134,535	16,174,407	726,417,628	21.3	83.1	79.6	1,160	1,353
Long Beach.....	88	89	38,097	70,052	20,246,463	2.5	4.6	64.8	250	790
Los Angeles City.....	9	8	220,210	117,637	1,215,027	133.9	71.6	100.0	150	150
Los Angeles, East.....	335	280	1,193,971	6,746,661	132,096,668	20.4	115.5	85.0	1,373	1,560
Mission.....	23	90	16,281	18,359	1,584,327	5.1	5.7	53.0	320	870
Newhall.....	70	87	1,563,017	19,733	18,264,183	131.3	1.7	93.9	923	923
Newhall-Potrero.....	3	5	2,017	194	166,862	9.5	0.7	6.6	30	178
Newport.....	186	214	1,193,799	500,244	8,437,352	26.3	15.3	29.7	883	908
Newport, West-Gas.....	1	1	320,073	26,614	3,353,181	61.3	8.1	8.2	270	270
Oak Canyon.....	37	45	321,490	80,992	660,452	67.8	10.5	12.4	491	713
Palmdale.....	116	151	321,490	2,227,227	82,450,128	15.7	108.7	87.4	475	540
Phon del Rey.....	33	34	226,701	306,271	6,841,580	29.5	53.3	57.5	273	315
Potrero.....	343	357	1,176,322	1,382,832	111,022,737	19.5	22.9	54.0	1,260	1,040
Rosemead.....	202	232	1,002,985	1,174,193	84,081,494	30.5	33.7	52.5	915	1,040
Salt Lake.....	7	7	37,295	232,136	43,999,334	32.3	218.7	87.1	15	903
Santa Fe Springs.....	531	604	2,670,722	11,154,090	826,012,855	28.8	120.4	80.7	1,010	1,410
Seal Beach.....	199	216	2,220,380	5,797,496	115,985,730	65.2	166.9	72.3	930	690
Seal Beach.....	789	837	1,196,258	1,196,258	125,713,265	10.6	9.1	40.2	4,670	8,798
Torrance.....	5	5	16,290	28,771	324,359	18.0	31.8	63.8	68	718
Whittier.....	160	194	178,021	873,798	21,864,559	6.7	21.8	76.4	91.2	640
Whittier.....	2,076	2,160	22,888,420	6,570,332	440,360,540	61.4	17.9	22.3	5,455	5,400
Los Angeles County:										
Alhambra Area.....	5	5	108,025	64,840	784,759	131.7	72.5	27.3	50	50
East Dominguez Area.....	4	4	3,706	17,077	79,078	39.7	48.3	89.9	10	10
East Dominguez Area.....	4	4	19,537	3,420	127,453	31.0	31.7	14.7	40	40
La Brea Area.....	1	1	1,037	2,084	18,317	5.9	11.6	66.5	10	10

SUMMARY OF OPERATIONS—OIL FIELDS

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Pueblo Area.....	2	2	3,569	291	5,731	9.9	0.8	7.5	99.2	20	20
Northwest Rosecrans Area.....	1	1	961	118	3,413,448	5.3	0.7	11.0	100.0	10	30
Simi Area.....	1	1	569	64	2,686	5.3	0.6	10.1	89.7	10	10
Whittier Heights Area.....	2	3	1,800	24	26,006	5.9	0.1	1.3	85.1	20	40
Orange County:											
Iserra Park Area.....	2	2	6,232	21,744	224,224	18.7	65.1	77.7	92.3	20	20
Talbert Area.....	1	1	2,187	2,167	19,656	12.4	12.5	60.1	96.1	10	10
San Bernardino County:											
Chino-Mahala Area.....	1	3	484	136	19,973	14.2	4.0	21.9	18.8	10	20
Totals.....	9,296	10,403	65,187,526	77,943,461	3,701,690,332	40.1	48.0	54.5	96.5	32,967	30,167
Imperial Carbon Dioxide Gas											
Diarr. 2—Bardahals.....	195	248	441,086	129,481	18,417,329	13.2	3.9	22.7	94.8	1,000	1,140
Montalvo, West.....	7	7	139,241	3,838	318,180	127.6	2.5	2.5	86.1	310	310
Ojai.....	66	104	140,723	40,216	3,755,815	15.0	4.3	22.2	78.6	600	820
Orland.....	8	12	197,391	2,793	3,131,181	160.0	2.3	1.3	85.2	230	230
Perris.....	160	203	975,166	213,417	14,906,095	26.7	8.0	18.0	91.7	1,040	1,040
Riverside.....	227	248	3,099,075	678,786	52,838,307	82.6	18.1	18.0	91.3	1,685	1,685
Santa Paula.....	36	50	32,308	22,123	2,380,831	7.3	4.2	26.6	80.7	225	480
Sequoia.....	30	38	42,861	9,421	3,564,935	11.3	2.5	18.0	70.1	200	650
Simi.....	54	73	23,328	106,935	2,400,739	2.3	1.9	45.7	96.0	1,415	1,415
South Mountain.....	194	207	1,310,723	106,972	32,112,001	59.3	3.2	7.8	95.0	1,415	1,415
Ventura.....	639	724	10,135,093	2,126,816	365,543,127	98.6	20.7	17.3	89.9	2,735	2,735
Totals.....	1,620	1,914	16,542,965	3,331,995	499,396,500	63.5	12.7	10.8	90.2	10,005	11,130
Diarr. 3—Arroyo Grande											
Castroville.....	29	44	15,954	49,901	1,896,038	5.8	18.3	75.9	79.3	310	600
Carmichael.....	77	73	348,987	2,225,987	13,183,831	20.3	183.4	85.8	95.8	220	370
Centerville.....	47	94	186,545	476,093	16,065,826	26.4	67.5	71.8	84.8	1,060	1,940
Cat Canyon.....	196	262	3,867,161	3,235,659	60,812,434	88.3	82.2	45.6	91.3	3,380	3,380
Elwood.....	79	101	1,345,283	2,005,809	84,329,404	101.5	147.0	59.1	94.2	640	690
La Gracia Gas.....	89			283						310	400
Leopold.....	9	111	196,733	96,320	17,121,272	144.4	70.7	32.9	83.6	1,900	2,000
Moody Gules.....	10	18	10,320	220,136	3,617,941	4.7	102.7	95.6	83.4	22	102
Orwell.....	1	1	129	2	62,168	10.8	0.2	2.0	6.6	10	40
Russell Ranch.....	257	328	853,457	1,571,559	108,341,873	20.3	27.4	64.8	92.1	3,980	4,900
San Ardo.....	98	99	2,791,237	87,397	3,631,743	241.0	5.0	2.0	87.7	920	920
San Ardo Valley.....	46	59	405,221	15,166	525,650	84.1	3.2	2.6	71.3	800	800
South Cuyamaca.....	471	506	3,190,575	4,329,572	94,747,648	377.2	62.6	57.2	94.3	6,330	6,330
Summerland.....	9	9	70,851	932	70,353	3.0	1.1	11.8	91.9	50	50
Summerland.....	15	15	3,780	2,064	3,160,653	5.5	3.8	40.8	75.8	20	55
Summerland.....	1	1									
Summerland.....	10	12	659,275	89,087	1,629,965	228.8	20.8	12.0	94.1	280	280
Summerland.....	1	2	43	3	359	21.5	1.5	6.5	1.1	0	0
Summerland.....	1	2	772	20	2,023	5.3	0.1	2.8	80.1	0	0
San Benito County.....											
San Luis Obispo County.....											
Guadalupe Area.....	5	6	10,596	4,586	16,326	17.9	7.3	20.6	84.3	50	50
Hinsdale Area.....	0	1	0	0	0	0.0	0.0	0.0	0.0	0	0
San Mateo County.....	0	1	0	0	0	0.0	0.0	0.0	0.0	0	0
Half Moon Bay Area.....	0	1	0	0	0	0.0	0.0	0.0	0.0	0	0
Santa Barbara County.....	1	7	261	1	20,238	4.7	0.0	0.5	23.8	10	30
Totals.....	1,249	1,767	14,004,293	14,391,186	408,450,516	62.6	64.3	50.7	91.6	20,022	24,027

TABLE 1—Continued
PRODUCTION STATISTICS OF CALIFORNIA OIL FIELDS—JANUARY 1 TO JUNE 30, 1949

Field	Average number of producing wells		Oil (bbl.)	Water including water in emulsion (bbl.)	Cumulative production of oil (bbl.)	Production per well per producing day		Percentage of time wells produced	Proved acreage	
	Actual	Potential				Barrels			As of June 30, 1949	Maximum
						Oil	Water			
Durr 4—Antelope Hills										
Ant Hill	28	30	244,972	713,064	3,970,824	87.0	105.9	74.4	255	255
Belridge, North	70	134	173,725	333,619	1,831,314	30.0	37.8	65.9	295	295
Belridge, South	555	1,059	4,082,922	46,200	86,821,814	54.3	33.2	39.3	1,905	1,905
Blackwelder Corner	26	28	22,294	158,084	846,996,407	12.0	11.2	48.3	6,630	6,755
Casal	31	39	329,810	50,473	13,700	4.9	35.1	97.7	200	200
Casuald Ranch	8	8	132,903	36,557	14,296,424	70.5	10.5	83.9	780	780
Colton Levee, North	110	126	3,106,888	133,370	46,179,014	108.2	29.2	13.0	210	210
Colton Levee, South	71	71	1,185,364	32,603	48,179,014	139.7	7.0	4.2	3,380	3,380
Colton Levee, South	71	71	1,185,364	32,603	16,132,006	130.0	5.7	4.2	3,300	3,300
Devils Den	346	438	2,943,199	3,342,987	32,272,134	49.5	56.3	83.2	2,465	2,520
Edison	13	25	16,863	40,109	184,815	11.3	27.0	70.5	180	260
Elk Hills	243	363	2,892,318	2,249,925	32,162,779	45.6	39.6	46.5	3,110	3,255
Elk Hills	143	691	1,488,247	2,084,789	199,933,907	90.6	126.9	58.3	16,980	17,100
Elk Hills	143	691	1,488,247	2,084,789	199,933,907	90.6	126.9	58.3	16,980	17,100
Fruitvale	194	224	1,316,607	2,699,430	46,325,118	41.6	85.1	67.2	2,115	2,310
Greely	103	103	2,532,982	828,923	39,096,644	171.1	56.2	24.7	1,960	2,080
Kern Bluff	95	95	483,804	447,500	960,291	29.2	26.9	47.9	475	475
Kern Fract.	624	710	1,832,452	4,663,668	70,339,701	12.6	42.5	77.1	4,230	4,235
Kern River	2,447	2,911	2,042,386	27,885,636	302,433,023	4.9	66.3	93.1	5,110	8,150
Leont Hills	599	655	1,291,062	4,943,844	1,63,849,286	12.4	47.6	79.3	3,310	3,380
McDonald Anticline	22	24	55,599	170,355	296,166	15.2	44.2	74.4	170	170
McKittrick-Tombler	206	310	688,103	2,165,302	97,203,002	18.7	58.8	73.9	1,360	1,520
Midway-Summit	3,771	4,546	14,534,055	18,740,897	1,112,575,753	22.4	28.9	98.8	43,545	47,925
Midway-Summit	18	79	2,142,935	38,185,401	103,392,098	22.3	398.3	94.7	3,120	3,225
Mt. Pono	541	562	577,678	695,980	51,104,102	21.3	24.8	87.9	2,010	2,725
Mountain View	163	213	2,190,284	120,140	22,672,068	171.6	6.6	96.2	6,330	6,330
Paloma	107	130	2,190,284	120,140	22,672,068	171.6	6.6	96.2	6,330	6,330
Paloma	107	130	2,190,284	120,140	22,672,068	171.6	6.6	96.2	6,330	6,330
Palo Verde	183	254	437,018	2,226,921	13,811,285	14.0	80.6	83.0	2,025	2,040
Palo Verde	183	254	437,018	2,226,921	13,811,285	14.0	80.6	83.0	2,025	2,040
Rio Bravo	91	101	2,171,841	439,870	49,491,065	135.6	27.5	16.8	1,870	1,890
Round Mountain	366	379	1,279,843	23,699,660	87,153,214	19.8	269.8	94.9	2,396	2,425
Strand	21	23	193,084	394,739	6,082,922	54.8	112.0	97.2	370	390
Tepic	86	90	454,831	339,059	3,586,733	30.5	22.7	95.8	1,005	1,005
Tepic	86	90	454,831	339,059	3,586,733	30.5	22.7	95.8	1,005	1,005
Ten Section	115	129	1,175,759	20,133	128,172	26.5	5.7	17.6	1,135	1,135
Waco	3	6	14,419	272,494	45,296,926	62.0	14.4	18.8	1,880	1,910
Waco	3	6	14,419	272,494	45,296,926	62.0	14.4	18.8	1,880	1,910
Wheeler Ridge	50	50	137,876	27,175	4,790,310	15.9	3.1	92.6	380	440

SUMMARY OF OPERATIONS—OIL FIELDS

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Kern County:									
Al Hill Area.....	1	539	807	1,136	5.4	8.1	60.0	55.2	10
Bellows Area.....	3	46,397	77,092	748,481	85.8	182.3	62.4	93.2	60
Chadler Corner Area.....	1	6,313	22	54,432	123.0	4	4	85.2	10
Chico-Martinez Area.....	4	4	0	729,995	28.7	95.8	76.0	63.0	30
Dyer Creek Area.....	1	2,240	7,471	0	0	0	0	0	10
Low Labor Area.....	1	0	0	793	0	0	0	0	10
Jasmine Area.....	8	24,639	66,979	148,186	18.4	50.1	73.1	92.3	70
McClung Area.....	1	321	3,500	106,188	4.0	437.5	91.6	4.4	10
McKittick Area.....	1	286	0	1,076	12.4	2.5	16.9	39.0	0
Roverbank Gas.....	*3								1,360
Buttonwillow Gas.....	*2								230
Semitarque Gas.....	*5								1,520
Trico Gas.....	*46								9 10,068
Totals.....	11,580	14,596	139,776,132	2,547,446,109	25.5	70.9	73.6	94.0	136,783
Diarr. 5—Coalinga.....	1,467	1,985	4,031,188	433,898,107	17.5	19.7	52.9	94.3	16,832
East Coalinga Extension.....	160	220	0,340,231	174,298,177	315.2	224.1	38.1	95.3	4,250
Guajarral Hills.....	16	15	855,406	0	315.2	0	0	0	490
Helm.....	76	100	715,296	595,342	65.3	46.9	45.4	92.2	4,325
Jaculow.....	104	106	1,233,350	260,735	68.5	14.5	17.5	95.7	2,860
Jaculow.....	*0	*5							
Kettleman Middle Dome.....	1	1	23,965	625,063	121.6	40.0	24.7	61.4	40
Kettleman North Dome.....	315	435	5,998,830	356,480,511	109.4	75.2	40.7	95.2	13,280
Pineau Valley.....	22	28	641,342	314,933	179.5	98.2	32.9	89.7	440
Pyramid Hills.....	24	25	40,288	539,798	9.5	4.7	33.1	97.7	145
Raisin City.....	47	52	613,264	954,455	76.1	118.3	60.9	94.8	1,055
Brendale.....	43	55	454,067	149,339	61.9	20.4	24.7	94.3	1,190
San Joaquin County:									
Bassett Area.....	2	2	27,899	84,998	95.9	219.6	68.9	77.9	20
Chico Creek Area.....	0	1	0	0	0	0	0	0	20
Choway Ranch Area.....	1	1	602	9,871	5.1	4	7.3	87.3	10
Kreyehagen Area.....	1	1	240	1,060	0	13.5	81.3	87.9	10
San Joaquin Area.....	5	5	78,230	223,576	89.0	42.9	32.5	97.1	170
Sonoma County:									
Petaluma Area.....	1	1	707	6,374	3.9	.1	3.3	99.4	50
Yuba County:									
Alfon Gas.....	*0	*2							
Chico Shosh Gas.....	*2	*2							
Europa Gas.....	*4	*5							
Fairfield Knolls Gas.....	*1	*2							
Hill Ranch Gas.....	*5	*9							
Kurey Hill Gas.....	*7	*10							
La Grange Gas.....	*4	*4							
Masonville Butte Gas.....	*7	*7							
McDonald Island Gas.....	*2	*2							
Miller Gas.....	*3	*3							
Orel Bred Gas.....	*3	*3							
Rio Vista Gas.....	*120	*145							
Roberta Island Gas.....	*1	*1							
Suisun Bay Gas.....	*3	*3							
Thornton Gas.....	*8	*9							
Tracy Gas.....	*2	*2							
Vernalis Gas.....	*2	*2							
Willows Gas.....	*0	*2							

TABLE 1—Continued
PRODUCTION STATISTICS OF CALIFORNIA OIL FIELDS—JANUARY 1 TO JUNE 30, 1949

Field	Average number of producing wells		Oil (bbl.)	Water including water in emulsion (bbl.)	Cumulative production of oil (bbl.)	Production per well per producing day				Percentage of time wells produced	Proved acreage		
	Actual	Potential				Barrels		Percentage	Water		As of June 30, 1949	Maximum	
						Oil	Water						
Battle County:													
Chico Area	*1										20	20	
Duck Creek Area	*0										80	80	
Kings County:													
Tren, N. W. Area	*1										20	20	
Madera County:													
Chorobilla Area	*0										80	80	
Moffatt Ranch Area	*1										20	20	
San Joaquin County:													
Galt Area	*1										20	20	
Solano County:													
Denver Area	*1										20	20	
Hacker Area	*1										20	20	
Winters Area	*1										20	20	
Tulare County:													
Crescent Area	*0										120	120	
Yuba County:													
Dunsmuir Hills Area	*0										780	780	
Pescadero Creek Area	*1										120	120	
Winters Area	*1										124	124	
Totals	2,294	2,924	25,448,108	18,012,132	1,011,004,179	64.8	45.9	41.4	94.5	80,892	283,719	308,834	
Grand Totals	26,156	31,696	11,171,307,923	283,476,911	8,168,497,638						283,719	308,834	
Abandoned Fields					1,240,019							418	
STATE TOTAL			171,297,926		8,169,737,655							309,259	

* Dry gas wells omitted from well totals.

† Adjusted figure, 158,457 bbls. accumulated production transferred from Newhall to Placerita (new field).

‡ Adjusted figure, 146,496 bbls. accumulated production transferred from Northwest Rosecrans Area to Rosecrans field.

§ Corrected figure due to receipt of amended production reports.

|| Includes 65 acres in San Luis Obispo County, District No. 3.

¶ Includes 120 acres in San Luis Obispo County, District No. 3.

‡ Includes 27,755 bbls. formerly carried in abandoned area.

* Area abandoned.

† Includes 1,000 acres in Kings County, District No. 5.

‡ Includes 953 acres in Contra Costa County, District No. 3.

§ Includes 1,227,831 bbls. condensate from Coles Levee, South, and Paloma.

ABANDONED FIELDS OR AREAS

	Cumulative production of oil (bbl.)	Proved average, maxi- mum
Durr 1—Los Angeles County:		
Laworth Area.....	54,829	10
La Mirada Area.....	20,571	10
Brea Area.....	1,585	10
Banning Area.....	1,585	10
Durr 2—Ventura County: Conejo Field.....	102,000	45
Durr 3—Santa Barbara County: Goleta Field.....	140,281	50
Santa Clara County: Sargent Field.....	783,759	50
San Luis Obispo County: Huasna Area.....	11,470	10
San Mateo County: Half Moon Bay Area.....	41,230	40
Durr 4—Kern County:		
Comanche Area.....	55	0
Northeast of Elliman Field.....	605	0
Geopline Area.....	3,871	0
Shafter Area.....	84,631	60
Tulare County: Terra Bella Area.....	25,016	40
Totals.....	1,340,019	415

TABLE II
AVERAGE DAILY 88L OIL AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, MCF.—JANUARY 1 TO JUNE 30, 1949

Field	JANUARY				FEBRUARY				MARCH			
	Oil Produced	Gas			Oil Produced	Gas			Oil Produced	Gas		
		Net produced	Used	Blown to air		Net produced	Used	Blown to air		Net produced	Used	Blown to air
DIST. 1—												
Alton Canyon	3,429	2,237	2,074	163	3,714	2,241	2,125	116	3,316	2,035	2,056	26
Beverly Hills	48	10	10	0	49	10	10	0	48	10	10	0
Brea-Olinda	15,233	14,427	14,409	21	15,425	13,984	13,844	140	15,361	14,051	14,034	16
Brea-Olinda		3,378	3,378	0		1,338	1,338	0		1,371	1,371	0
Coyote, East	5,835	3,272	3,225	47	6,082	3,412	3,324	88	6,120	3,447	3,560	67
Coyote, West	14,840	22,142	21,862	280	14,219	18,718	18,570	146	13,937	18,280	18,186	103
Del Valle	5,219	15,005	14,985	22	5,307	14,959	14,922	37	5,310	14,941	14,917	24
Dominguez	12,914	18,786	18,771	15	13,343	17,902	17,878	24	13,690	18,260	18,239	21
El Segundo	350	5,436	5,429	7	496	3,706	3,691	15	338	234	227	7
Huntington Beach	58,551	45,531	45,578	53	58,281	45,127	45,064	63	60,265	47,826	45,184	2,642
Imperial	13,008	9,816	9,795	21	13,599	10,506	10,504	2	13,575	10,124	10,123	1
Landsdale	1,213	5,786	5,734	52	1,146	4,516	4,514	2	1,033	2,931	2,929	2
Long Beach	22,692	19,423	19,423	0	22,215	19,406	19,400	6	22,135	19,333	19,333	0
Los Angeles City	198	1,137	1,104	33	192	1,326	1,306	20	207	1,849	1,872	0
Los Angeles East	1,670	1,073	1,073	0	1,670	1,243	1,243	0	1,670	1,243	1,243	0
Marathon	6,180	7,344	6,972	372	6,732	7,267	7,267	103	6,734	7,584	7,584	17
Merced	100	84	13	71	155	37	37	118	85	23	41	190
Northwell	8,324	4,415	4,415	0	8,251	4,420	4,420	0	8,908	4,558	4,558	0
Newport	19	0	0	0	23	0	0	0	19	0	0	0
Newport, West	6,825	2,595	2,591	5	6,787	2,499	2,494	5	6,724	2,442	2,442	1
Oak Canyon	1,888	2,255	2,061	194	1,852	2,257	2,155	102	1,785	2,157	2,157	21
Pacifica	808	86	72	14	593	106	88	18	1,557	167	90	77
Playa del Rey	1,767	1,495	1,495	0	1,803	1,408	1,408	0	1,789	1,483	1,483	0
Playa del Rey		1,029	1,029	0		1,848	1,848	0		1,883	1,883	0
Potrero	1,238	15,004	15,000	4	1,216	16,300	16,300	0	1,250	16,928	16,928	0
Richfield	6,441	4,791	4,641	150	6,476	4,742	4,651	91	6,419	4,951	4,951	93
Rosemead	5,215	9,580	9,524	26	5,350	9,751	9,743	8	5,350	10,473	10,447	28
Salt Lake	225	0	0	0	199	12,746	12,746	0	198	0	0	0
San Joaquin	14,008	13,298	13,298	0	14,008	13,298	13,298	0	14,008	13,298	13,298	0
Seal Beach	11,704	8,423	8,398	25	11,659	8,077	8,056	16	12,291	10,111	10,046	65
Seal Beach		4,080	4,055	24		8,082	4,040	25		7,740	4,138	33
Torrance	7,777	4,080	4,055	24	8,082	4,055	4,040	25	7,740	4,138	4,138	33
Torrance		77	44	33		94	73	42		80	72	40
Whittier	902	541	513	28	938	557	535	22	924	528	504	24
Whittier		146,139	146,050	89		146,451	146,324	127		144,558	144,460	98
Los Angeles County:												
Alondra Area	570	292	282	0	667	355	355	0	624	343	343	0
East Dominguez Area	20	38	11	27	21	55	26	20	31	14	14	37
Hyperion Area	122	44	22	22	109	46	25	21	105	42	25	17
Lettingwell Area	6	55	55	0	6	40	40	0	6	50	50	0

TABLE II—Continued
AVERAGE DAILY BBL OIL, AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, MCF.—JANUARY 1 TO JUNE 30, 1940

Field	JANUARY				FEBRUARY				MARCH			
	Produced	Net produced	Gas		Produced	Net produced	Gas		Produced	Net produced	Gas	
			Used	Blown to air			Used	Blown to air			Used	Blown to air
Dist. 4—Antelope Hills.												
Axt Hill	1,408	599	367	332	1,543	706	519	187	1,303	621	329	92
Bairdridge, North	1,078	41	41	0	992	40	40	0	982	38	38	0
Bairdridge, North Tumbler Zone	3,298	66,660	68,960	920	3,116	72,203	71,108	1,089	3,496	62,707	62,706	938
Bairdridge, South	7,163	(511)	0	0	7,507	(1,700)	0	0	7,818	(8,468)	0	0
Bairdridge, South Tumbler Zone	2,280	11	2,211	50	2,407	2,303	2,303	0	2,418	2,403	0	0
Chadwell Corner	1,320	19	1,318	0	1,332	31	21	0	1,323	19	19	0
Chadwell	1,829	328	328	128	1,901	1,374	1,374	0	1,828	1,427	1,427	321
Chadwell Branch	260	144	16	58	271	328	45	283	724	797	273	68
Chadwell	17,232	(1,555)	0	0	17,100	(4,628)	0	94	16,941	(4,006)	0	0
*Colen Lerse, North	6,724	6,724	6,724	0	6,601	3,551	3,551	0	6,640	3,237	3,237	0
*Colen Lerse, South	6,779	6,710	6,691	19	6,601	6,612	6,602	10	6,640	6,602	6,602	2
*Colen Lerse, South	5,359	5,359	5,359	0	5,477	5,477	5,477	0	5,302	5,302	5,302	0
*Colen Lerse, South	32,419	31,583	31,583	836	32,031	31,602	31,602	429	30,004	29,084	29,084	920
Cynaric	18,078	28	28	0	17,084	66	31	0	16,853	9	9	0
Devils Den	14,380	5,861	5,853	46	14,181	5,933	5,782	181	14,123	6,287	6,101	186
Edison	6,012	(467)	0	231	7,322	(370)	0	204	7,813	539	0	539
*Elk Hills	3,402	3,402	3,402	0	3,204	3,204	3,204	0	2,811	2,811	2,811	0
Frutvair	7,123	3,260	1,535	65	7,269	1,535	1,535	63	7,420	1,426	1,174	281
Frederick	1,612	3,153	1,541	1,949	1,449	3,560	3,483	14	1,481	3,250	3,250	0
Kern	3,810	0	0	0	3,810	0	0	0	3,810	0	0	0
Kern	7,791	1,074	980	84	7,791	1,081	991	96	7,791	983	895	87
Kern	12,188	39	39	0	12,653	43	43	0	12,437	39	39	0
Loft Hills	7,633	4,344	3,764	780	7,640	4,660	3,760	870	7,411	4,729	3,711	1,018
McDonald Anticline	406	1,121	860	261	372	1,182	888	323	4,439	1,045	926	122
McKittrick Tumbler	4,300	1,308	1,288	18	4,378	1,426	1,422	4	4,439	1,485	1,435	80
Midway-Sunset	84,562	40,076	39,590	516	84,904	42,503	42,043	460	84,253	44,323	43,778	545
*Midway-Sunset	3,393	3,393	3,393	0	3,511	3,511	3,511	0	3,511	3,782	3,782	0
Monn's Pano	11,664	187	172	15	11,524	179	160	19	12,075	188	154	34
Mountain View	3,279	3,063	2,944	149	3,269	2,953	2,904	255	3,192	3,003	2,676	539
Mountain View	17,108	38,434	36,612	1,822	17,519	41,765	40,781	984	17,804	44,296	43,559	737
*Paloma	0	0	0	0	2,772	198	195	3	2,826	0	0	0
Pano Creek	2,430	190	187	3	2,772	198	195	3	2,826	0	0	0
Rio Bravo	1,217	4,837	4,837	0	12,034	4,840	4,840	0	12,156	4,849	4,849	0
Round Mountain	3,810	3,810	3,810	0	3,810	3,810	3,810	0	3,810	3,810	3,810	0
Strand	1,071	733	717	18	1,042	743	743	0	1,042	708	708	0
Texas	2,562	981	877	104	2,560	992	890	102	2,560	805	710	95
Texas Hills	292	0	0	0	323	0	0	0	368	0	0	0
Ten Section	6,812	23,560	23,560	0	6,375	22,094	22,094	0	6,329	21,488	21,488	0
Waco	47	39	11	28	119	79	24	55	58	41	17	24
Wooler Ridge	737	222	186	36	784	220	184	36	774	302	264	38

TABLE 11—Continued
AVERAGE DAILY BBL OIL AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, WCF.—JANUARY 1 TO JUNE 30, 1949

Field	JANUARY						FEBRUARY						MARCH					
	Oil		Gas		Blown to air	Produced	Oil		Gas		Blown to air	Produced	Oil		Gas		Blown to air	Produced
	Produced	Net produced	Used	Used			Produced	Net produced	Used	Used			Produced	Net produced	Used	Used		
Dist. 3—Continued																		
•Suman Bay Gas.....		11,456	11,456		0				9,404		0				10,205		0	
•Thompson Gas.....		23,385	23,385		0				19,669		0				13,973		0	
•Tracy Gas.....		4,980	4,980		0				1,534		2				770		0	
•Vernalis Gas.....		2,184	2,184		0				2,442		0				2,377		0	
Bottle County:																		
•Chico Area.....		584	584		0				395		0				525		0	
•Dishman Area.....		2	2		0				0		0				0		0	
•Fowler Area.....		574	574		0				599		0				599		0	
•Tocco N. W. Area.....		530	530		0				408		0				410		23	
Madura County:																		
•Madasi Ranch Area.....		474	474		0				480		0				455		0	
San Joaquin County:																		
•Galt Area.....		367	367		0				337		0				90		0	
Solano County:																		
•Denverton Area.....		0	0		0				0		0				18		0	
•Hunker Area.....		1,483	1,483		0				835		0				0		0	
•Winters Area.....		0	0		0				1		1				0		1	
Yuba County:																		
•Dunnigan Hills Area.....		0	0		0				0		0				0		0	
•Fremont Creek Area.....		0	0		0				0		0				0		0	
•Winters Area.....		0	0		0				0		0				0		0	
Totals.....	112,202	1,038,595	1,028,027	1,028,027	10,539	143,822	989,039	958,440	10,599	140,914	861,268	856,102	5,106					
Grand totals.....	949,459	1,958,027	1,929,270	1,929,270	28,757	956,648	1,874,038	1,848,635	25,403	959,410	1,731,824	1,709,390	22,434					
Gas returned from storage.....		132,266	132,266	132,266				26,994	26,994				2,576					

NOTE: Parentheses indicate negative figures due to net storage when volume of gas injected was in excess of volume of gas withdrawn and are not included in the totals. Gas blown in such cases was replaced by gas from other sources, and is not included in totals.

* Dry gas wells.

* Considered to be returned from storage, carried in separate total.

* Oil produced from the Temblor Zone is included with that shown in North Belridge.

TABLE II—Continued
AVERAGE DAILY BBL. OIL, AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, WCF—JANUARY 1 TO JUNE 30, 1949

Date	Field	APRIL				MAY				JUNE			
		Oil		Gas		Oil		Gas		Oil		Gas	
		Produced	Net produced	Used	Blown to air	Produced	Net produced	Used	Blown to air	Produced	Net produced	Used	Blown to air
Dec. 1	Aliso Canyon	3,511	2,211	2,136	75	3,879	2,371	2,265	106	3,428	2,349	2,204	85
	Beverly Hills	80	11	11	0	80	10	10	0	91	10	10	0
	Brea-Olinda	15,540	15,045	14,915	129	15,401	14,108	13,887	221	15,022	14,648	14,623	25
	Brea-Olinda		1,466	1,464	0		1,415	1,415	0		1,465	1,465	0
	Coyote, East	6,244	4,181	4,078	103	5,932	3,910	3,781	129	4,764	3,858	3,821	37
	Coyote, West	13,716	19,141	18,997	174	13,875	19,347	19,166	181	13,423	19,797	19,661	136
	Del Valle	5,225	18,338	18,344	14	5,162	16,116	15,106	10	4,946	14,891	14,862	29
	Dominguez	13,408	20,210	20,142	69	13,218	18,659	18,651	19	12,863	19,152	19,132	20
	El Segundo	367	(811)	0	7	342	(2,208)	0	21	353	(2,133)	0	19
	Huntington Beach	90,951	49,720	48,543	1,177	61,267	50,491	49,029	862	59,282	48,700	48,667	33
	Indlewood	14,112	10,480	10,417	13	14,408	10,425	10,425	1	14,232	10,523	10,524	1
	La Brea	880	2,184	2,185	0	880	2,185	2,185	0	880	2,185	2,185	0
	Long Beach	22,213	19,368	19,368	0	22,689	19,685	19,685	0	22,875	20,015	20,015	0
	Los Angeles City	1,277	1,791	1,747	14	1,353	1,817	1,801	16	1,246	1,932	1,897	35
	Los Angeles, East	6,604	7,828	7,662	166	6,492	7,765	7,667	188	6,510	7,897	7,722	175
	Montebello	83	63	48	45	89	65	51	44	81	65	59	26
	Newhall-Potrero	8,636	4,589	4,589	0	8,793	3,325	3,325	0	8,880	4,069	3,872	217
	Newport	18	0	0	0	12	0	0	0	0	0	0	0
	Newport, West	6,525	2,392	2,391	0	6,469	2,159	2,158	0	6,238	2,112	2,111	1
	Oak Canyon	1,785	2,237	2,139	98	1,691	2,177	2,140	37	1,642	2,114	2,093	21
	Placencia	2,421	467	71	395	3,529	873	76	497	7,658	725	101	634
	Playa del Rey	1,772	1,772	1,772	0	1,747	1,568	1,568	0	1,763	1,650	1,600	0
	Playa del Rey	1,4713	1,4713	1,4713	0		3 (1,921)		0		3 (3,089)		0
	Potrero	1,265	18,014	18,014	0	1,230	18,888	18,888	0	1,221	19,072	19,063	9
	Richfield	6,964	6,072	5,974	99	6,980	5,610	5,584	26	6,814	5,512	5,491	23
	Romeros	5,978	12,195	12,195	0	6,297	11,851	11,851	0	6,295	12,580	12,580	0
	Salt Lake	15,012	14,433	14,433	0	14,596	13,753	13,753	0	14,527	13,853	13,853	0
	Salt Lake Springs	12,107	10,620	10,572	47	12,778	11,567	11,464	2	12,845	11,699	11,693	66
	Shaw Beach	7,620	4,138	4,118	20	7,481	4,178	4,159	19	7,518	4,310	4,282	28
	Torrance	89	71	38	33	88	4,178	4,159	34	83	71	36	36
	Turnbull	930	551	517	34	1,107	600	530	70	1,097	663	507	156
	Whittier	123,868	144,456	144,102	388	122,265	141,265	141,157	108	121,792	142,481	142,356	123

TABLE 11—Continued
AVERAGE DAILY BBL OIL AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, MCF.—JANUARY 1 TO JUNE 30, 1949

Field	APRIL				MAY				JUNE			
	Oil Produced	Net produced	Gas		Oil Produced	Net produced	Gas		Oil Produced	Net produced	Gas	
			Used	Blown to air			Used	Blown to air			Used	Blown to air
Dist. 1—Continued												
Los Angeles County:												
Alondra Area:	903	338	338	0	592	343	343	0	562	326	323	3
East Dominguez Area:	21	28	11	17	20	45	14	31	20	40	12	28
Hyperion Area:	106	40	26	14	123	42	24	18	92	40	23	17
Leffingwell Area:	6	61	61	0	5	56	56	0	5	56	56	0
Pomona Area:	19	0	0	0	18	0	0	0	16	0	0	0
Northwest Rosemead Area:	5	0	0	0	5	0	0	0	5	0	0	0
Simi Area:	4	3	3	0	3	3	3	0	3	3	0	0
Whittier Heights Area:	10	0	0	0	9	0	0	0	10	0	0	0
Orange County:												
Brea Park Area:	31	11	11	0	28	8	8	0	35	13	13	0
Talbert Area:	12	0	0	0	12	0	0	0	11	0	0	0
San Bernardino County:												
Chino-Makaha Area:	5	0	0	0	0	0	0	0	0	0	0	0
Totals:	390,819	390,281	387,135	3,145	361,229	383,239	380,519	2,720	356,979	386,947	384,942	2,005
Imperial Carbon Dioxide Gas		426	426	0		447	447	0		438	438	0
Dist. 2—Bardonia:	2,515	4,980	4,434	456	2,401	4,941	4,882	59	2,442	5,022	4,975	47
Montalvo, West:	795	1,300	1,250	70	860	1,477	1,369	88	822	1,535	1,535	60
Opal:	1,187	2,276	2,217	59	1,122	2,385	2,323	56	1,088	2,447	2,447	23
Pruned:	5,345	4,989	4,496	393	5,387	5,280	4,914	336	5,335	5,267	4,948	1
Rego:	17,437	24,309	24,309	184	17,409	25,984	25,691	293	17,880	27,994	27,798	319
Sanja Paula:	229	13	13	0	365	13	13	0	338	13	13	0
Sage:	242	33	23	10	243	35	25	10	272	35	35	10
Simi:	140	25	25	0	133	27	27	0	54	3	3	0
South Mountain:	7,457	10,863	10,301	562	7,514	10,964	10,749	215	6,773	10,012	9,880	132
Ventura:	56,253	105,684	105,448	236	56,686	106,363	106,291	72	58,968	113,449	112,934	515
Totals:	92,419	152,854	150,899	1,956	92,784	158,702	157,577	1,125	94,213	164,065	162,517	1,545

Dist. 3—Arroyo Grande.											
Capitan.....	85	2,530	2,469	3	0	96	5	5	106	5	5
Camalia.....	2,003	965	966	0	70	1,863	2,382	2,206	1,831	2,145	61
Cat Canyon.....	22,746	8,025	8,500	261	291	18,759	8,490	4,76	18,338	301	175
Elwood.....	7,093	6,091	6,068	23	778	7,263	5,905	5,438	7,375	4,946	511
La Vidua Gas.....	0	(38,357)	0	0	0	(69,192)	0	(62,146)	0	0	95
Lompoc.....	1,243	173	97	89	0	1,222	158	290	290	43	32
Moody Gulch.....	33	0	0	0	0	55	0	4	38	0	0
Orcutt.....	4,634	7,826	7,748	78	78	4,784	7,863	7,646	4,772	5,014	56
Russell Ranch.....	15,512	4,678	900	3,778	0	15,796	4,556	1,000	18,748	3,892	2,912
San Ardo.....	2,722	33	33	0	0	3,394	10	10	722	5	0
Santa Maria Valley.....	17,570	35,178	34,441	737	0	17,128	33,446	32,515	16,234	35,525	1,000
South Cuyama.....	24	0	0	0	0	540	207	7	1,896	644	596
Sunmerhead.....	0	1,031	1,031	0	0	28	868	868	0	893	0
Sumnerhead.....	3,820	0	0	0	0	3,790	0	0	3,815	0	0
Zaca.....	0	0	0	0	0	0	0	0	1	0	0
Monterey County.....	2	0	0	0	0	6	0	0	4	0	0
San Benito County.....	30	0	0	0	0	40	0	0	96	0	0
San Luis Obispo County.....	0	0	0	0	0	2	0	0	2	0	0
Guadalupe Area.....											
Santa Barbara County.....											
Totals.....	79,101	65,349	69,545	5,804	77,047	61,074	55,533	5,541	73,494	62,331	5,438
Dist. 4—Antelope Hills.											
Ant Hill.....	1,411	671	616	85	1,454	790	730	60	1,011	563	84
Belridge, North.....	940	37	37	0	862	37	37	0	850	38	0
Belridge, North Tumbler Zone.....	3,530	00,562	50,656	906	3,622	64,124	63,065	1,029	3,606	64,927	662
Belridge, South.....	5,043	929	869	40	4,374	470	470	0	3,791	488	0
Blackwells Corner.....	119	20	20	0	116	19	19	0	117	20	0
Casal.....	1,850	1,831	1,831	19	1,900	2,711	2,711	0	1,894	2,577	0
Chaffield Ranch.....	919	999	980	19	967	1,000	1,026	34	1,147	1,182	90
Colas Levee, North.....	17,308	(5,372)	0	101	17,272	(6,022)	0	93	17,241	(5,331)	138
Colas Levee, North.....	6,661	5,658	5,618	40	6,482	5,675	5,662	14	6,312	5,375	42
Colas Levee, South.....	4,610	4,610	4,610	0	4,610	4,610	4,610	0	4,610	4,610	0
Colas Levee, South.....	26,530	26,138	26,138	404	14,931	25,665	25,519	2,146	14,870	24,432	1,850
Dwight Den.....	37	11	11	0	107	14	14	0	200	15	0
Edna Hills.....	14,567	6,128	6,006	172	14,253	6,071	5,753	318	14,369	6,465	249
Edna Hills.....	8,152	(185)	0	1,096	9,117	(2,316)	6,316	0	10,916	(207)	2,068
Freitvale.....	7,314	3,700	3,700	68	7,152	3,616	3,616	496	7,425	5,621	266
Greely.....	14,162	3,625	3,550	75	14,079	2,835	2,829	6	13,064	1,417	1
Kern Bluff.....	2,653	962	898	84	2,831	874	874	0	2,423	3,524	366
Kern Front.....	7,844	0	0	0	7,844	0	0	0	7,844	0	0
Kern River.....	11,100	40	40	0	10,013	39	39	77	7,163	904	94
Leont Hills.....	7,060	40	40	1,090	6,902	4,348	3,548	794	6,474	4,154	908
McDonald Antelope.....	302	961	901	88	2,890	1,860	1,860	20	2,406	1,619	46
McKittrick-Tumbler.....	4,833	1,802	1,734	68	2,495	4,237	4,237	30	2,406	1,594	46
Midway-Sunset.....	90,366	43,302	43,302	675	74,636	42,376	42,376	230	72,360	41,336	273
Midway-Sunset.....	2,397	2,397	2,397	10	1,715	1,715	1,715	0	1,715	1,715	0
Mount Paso.....	11,870	202	192	10	11,715	1,262	1,262	60	11,778	266	73

TABLE II—Continued
AVERAGE DAILY RBL OIL AND AVERAGE DAILY FORMATION GAS PRODUCTION AND DISPOSITION, MCF—JANUARY 1 TO JUNE 30, 1949

Field	APRIL				MAY				JUNE			
	Oil	Gas			Oil	Gas			Oil	Gas		
	Produced	Net produced	Used	Blown to air	Produced	Net produced	Used	Blown to air	Produced	Net produced	Used	Blown to air
Dist. 4—Continued												
Mountain View	3,176	2,559	2,700	250	2,948	2,943	2,815	128	3,153	2,987	2,815	179
Paloma	18,045	42,972	42,248	1,724	17,942	45,480	43,542	1,938	17,634	47,041	46,553	1,488
Paloma	0	0	0	0	0	0	0	0	0	0	0	0
Paso Creek	2,822	190	163	27	2,166	156	133	25	2,128	147	147	0
Rio Bravo	11,779	4,746	4,685	261	11,970	4,782	4,672	190	11,651	5,372	5,194	178
Round Mountain	7,148	31	31	0	6,917	30	30	0	6,890	28	28	0
Stroud	1,097	796	785	1	1,034	701	675	26	1,110	732	728	6
Texas	2,487	865	771	95	2,494	1,000	937	63	2,433	1,027	937	90
Texas Hills	854	0	0	0	701	0	0	0	711	0	0	0
Ten Section	6,469	22,170	22,170	0	6,338	22,704	22,704	0	6,478	22,441	22,441	0
Wheeler Ridge	168	40	23	37	141	32	22	41	170	35	28	32
Wheeler Ridge	742	323	382	43	747	327	265	62	789	363	275	90
Kern County												
Ant Hill Area	0	0	0	0	4	0	0	0	3	0	0	0
Bellows Area	252	193	177	16	253	193	193	0	242	181	166	15
Caldera Corner Area	0	0	0	0	112	145	0	145	116	198	0	198
Chico-Martinez Area	0	0	0	0	0	0	0	0	0	0	0	0
Dyer Creek Area	42	0	0	0	13	0	0	0	10	0	0	0
Jasmine Area	129	0	0	0	115	0	0	0	148	0	0	0
Los Lobos Area	0	0	0	0	0	0	0	0	0	0	0	0
McKittrick Area	7	0	0	0	0	0	0	0	4	0	0	0
McKittrick Area	0	0	0	0	0	0	0	0	0	0	0	0
Boerhaak Gas	280	280	280	0	0	78	78	0	0	0	0	0
Bottomwater Gas	523	523	523	0	0	393	393	0	0	393	393	0
Bottomwater Gas	1,321	1,321	1,321	0	0	1,150	1,150	0	0	1,065	1,065	0
Trono Gas	6,774	6,774	6,774	0	0	5,173	5,173	0	0	3,999	3,999	0
Totals	278,804	258,053	252,123	5,930	295,236	258,498	250,873	8,035	293,732	290,790	283,563	7,218
Dist. 5—Coalinga												
East Coalinga Extension	25,074	3,347	2,625	822	24,375	3,293	2,756	537	21,571	3,231	2,731	500
Guajarral Hills	55,465	86,374	85,186	1,188	54,696	84,836	82,291	2,545	54,703	87,245	85,371	1,914
Helm	5,255	3,336	2,988	348	6,376	4,201	3,728	473	7,424	5,019	4,700	319
Jawollon	2,940	10,924	10,916	8	4,098	10,897	10,897	0	3,866	10,513	10,513	0
Kettleman	6,788	8,567	8,290	307	6,983	8,832	8,466	366	6,407	9,316	8,745	571
Kettleman Middle Dome	32,110	1,076	1,076	0	112	1,204	1,108	96	238	2,599	2,499	100
Kettleman North Dome	32,512	294,800	294,493	447	32,837	199,541	199,300	241	32,277	195,409	194,102	1,307
Peanut Valley	3,448	4,403	4,226	179	3,431	4,347	3,979	368	3,244	3,700	3,514	186
Pyramid Hills	229	28	28	0	219	28	28	0	227	28	28	0

SUMMARY OF OPERATIONS—OIL FIELDS

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	1,910	1,905	3,482	2,575	1,910	1,905	3,482	2,575	2,037	1,903	134	3,644	1,990	1,776	123
Rainey City.....	1,910	1,905	3,482	2,575	1,910	1,905	3,482	2,575	2,037	1,903	134	3,644	1,990	1,776	123
Riverdale.....	5,497	5,483	5,497	5,483	5,497	5,483	5,497	5,483	5,612	5,535	77	2,562	4,565	4,967	1
Reyno County.....															
Reyno Area.....	85	40	195	195	85	40	195	195	82	38	44	222	84	39	45
Cherry Ranch Area.....	128	128	128	128	128	128	128	128	136	0	0	0	129	129	0
Kreyenbagen Area.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Joaquin Area.....	106	37	497	497	106	37	497	497	153	25	127	303	177	32	145
Sonoma County.....															
Petaluma Area.....	0	0	4	4	0	0	4	4	0	0	0	3	0	0	0
Alton Gas.....	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,131	1,131	0	0	803	803	0
Cachoe Slough Gas.....	0	0	0	0	0	0	0	0	19	0	19	0	0	0	0
Euclid Gas.....	3,829	3,829	3,829	3,829	3,829	3,829	3,829	3,829	3,585	3,585	0	0	3,148	3,148	0
Fairfield Knolls Gas.....	2,960	2,960	2,960	2,960	2,960	2,960	2,960	2,960	435	435	0	0	253	253	0
Gill Ranch Gas.....	10,798	10,798	10,798	10,798	10,798	10,798	10,798	10,798	9,937	9,937	54	0	9,991	9,991	1
Kelly Hill Gas.....	2,973	2,973	2,973	2,973	2,973	2,973	2,973	2,973	2,588	2,588	0	0	2,172	2,172	0
Laurel Plains Gas.....	4,379	4,379	4,379	4,379	4,379	4,379	4,379	4,379	3,900	3,900	0	0	4,107	4,107	0
Marine Islands Gas.....	2,194	2,194	2,194	2,194	2,194	2,194	2,194	2,194	1,734	1,734	0	0	1,476	1,476	0
McDonald Island Gas.....	2,826	2,826	2,826	2,826	2,826	2,826	2,826	2,826	1,324	1,324	0	0	1,292	1,292	0
Miller Gas.....	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,681	2,254	2,254	0	0	1,798	1,798	0
Oil Bond Gas.....	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,831	1,425	1,425	0	0	1,205	1,205	0
Rio Vista Gas.....	253,017	253,017	253,017	253,017	253,017	253,017	253,017	253,017	218,005	218,005	9	200,553	200,553	200,543	40
Roberts Island Gas.....	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	1,007	0	0	1,013	1,013	0
Salt Lake Gas.....	7,482	7,482	7,482	7,482	7,482	7,482	7,482	7,482	3,479	3,479	0	0	3,541	3,541	0
Thornton Gas.....	7,709	7,709	7,709	7,709	7,709	7,709	7,709	7,709	4,920	4,920	0	0	3,060	3,060	0
Tracy Gas.....	8	8	8	8	8	8	8	8	5	5	0	0	196	196	0
Vernalis Gas.....	2,341	2,341	2,341	2,341	2,341	2,341	2,341	2,341	2,280	2,280	0	0	1,800	1,800	0
Butte County.....															
Chico Area.....	391	391	391	391	391	391	391	391	410	410	0	0	97	97	0
Durham Area.....	0	0	0	0	0	0	0	0	3	3	0	0	3	3	0
Elgin County.....															
Elgin Area.....	508	508	508	508	508	508	508	508	496	496	0	0	511	511	0
Frederick W. Area.....	667	667	667	667	667	667	667	667	642	642	0	0	545	545	0
Marquette County.....															
Marquette Area.....	475	475	475	475	475	475	475	475	495	495	0	0	494	494	0
San Joaquin County.....															
Salt Lake Area.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sequoia County.....															
Sequoia Area.....	102	102	102	102	102	102	102	102	0	0	0	0	0	0	0
Hinkler Area.....	0	0	0	0	0	0	0	0	2,319	2,319	0	0	4,822	4,822	0
Winners Area.....	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
Yuba County.....															
Dunsmuir Hills Area.....	0	0	0	0	0	0	0	0	501	501	0	0	68	68	0
Pinnock Creek Area.....	0	0	0	0	0	0	0	0	0	0	0	0	2,191	2,191	0
Winners Area.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals.....	140,690	639,746	639,746	639,746	140,690	639,746	639,746	639,746	588,185	588,084	5,091	138,790	509,549	594,294	5,225
Grand totals.....	951,633	1,506,383	1,506,383	1,506,383	951,633	1,506,383	1,506,383	1,506,383	1,430,096	1,427,866	22,502	928,199	1,443,872	1,422,408	21,464
Gas returned from storage.....		5,177	5,177	5,177		5,177	5,177	5,177	415	415	0		465	465	0

NOTE. Parentheses indicate negative figures due to net storage; when volume of gas injected was in excess of volume of gas withdrawn and was not included in the totals. Gas blown in such cases was replaced by gas from other sources, and is not included in totals.

* Dry gas wells.

† Considered to be returned from storage, carried in separate total.

‡ Oil produced from the Temblor Zone is included with that shown in North Belridge.

TABLE III
NATURAL GAS RESERVES, MCF.

Field	Gas reserves January 1, 1949	Gas injected January to June 1949	Gross Gas withdrawn January to June 1949	Net Gas withdrawn January to June, 1949	Gas reserves July 1, 1949
DIST. 1—Aliso Canyon	62,954,323	0	497,041	497,041	62,549,282
*Beverly Hills	0	0	1,886	1,886	0
Brea Olinda	39,319,063	0	2,676,271	2,676,271	36,642,792
Coyote, East	11,643,239	0	675,466	675,466	10,967,773
Coyote, West	38,718,484	4,494,332	7,949,685	3,545,353	55,173,131
Del Valle	31,863,811	0	2,720,159	2,720,159	29,173,652
Dominguez	35,389,566	0	3,411,795	3,411,795	21,977,771
El Segundo	9,134,767	291,767	412,677	120,910	9,013,857
Huntington Beach	64,659,604	99,495	8,787,603	8,688,108	55,971,496
Inglewood	14,277,891	0	1,864,178	1,864,178	12,413,713
Lawndale	4,691,077	0	546,982	546,982	4,144,115
Long Beach	68,585,200	0	3,542,864	3,542,864	65,042,336
East Los Angeles	7,954,593	0	298,126	298,126	7,656,377
Montebello	25,789,868	0	1,398,667	1,398,667	24,391,201
*Newhall	0	0	22,383	22,383	0
*Newhall Potrero	144,732,421	5,027,536	5,801,835	774,299	143,958,122
*Newport	0	0	0	0	0
*Newport, West	8,670,466	0	428,200	428,200	8,242,266
*Newport, West-Gas	0	0	0	0	0
Oak Canyon	25,600,490	0	398,596	398,596	25,201,894
*Placerville	0	0	64,313	64,313	0
Playa del Rey	3,740,124	0	283,209	283,209	3,456,915
Playa del Rey	3,352,393	1,010,609	1,062,176	1,81,567	3,560,826
Potrero	11,695,357	0	3,144,434	3,144,434	8,550,923
Richfield	16,391,708	0	956,251	956,251	15,435,457
Rosemead	24,232,697	45,038	2,067,530	2,022,492	22,210,205
*Salt Lake	0	0	0	0	0
Santa Fe Springs	44,480,711	7,591	2,454,885	2,447,294	42,033,417
Seal Beach	14,345,942	0	1,855,239	1,855,239	12,530,703
Torrance	13,238,786	0	752,239	752,239	12,486,547
Turnbull	133,323	0	13,072	13,072	120,251
Whittier	1,620,091	0	103,723	103,723	1,516,368
Wilmington	299,838,392	0	28,100,731	26,100,731	273,737,661
Los Angeles County:					
Alondra Area	4,684,583	0	60,177	60,177	3,974,386
*East Dominguez Area	0	0	7,737	7,737	0
*Hyperion Area	0	0	7,650	7,650	0
*Ledingwell Area	0	0	9,609	9,609	0
*Simi Area	0	0	315	315	0
Orange County:					
*Buena Park Area	0	0	2,143	2,143	0
San Bernardino County:					
*Chino-Mahala Area	0	0	0	0	0
Totals	1,041,380,880	10,886,368	80,289,827	69,403,459	972,073,437
DIST. 2—Bardonia	8,300,000	0	841,649	841,649	7,458,351
*Montalvo, West	0	0	249,268	249,268	0
*Ojai	50,108	0	104,079	53,971	0
*Oxnard	0	0	61,584	61,584	0
*Piru	45,589	0	931,411	885,822	0
Rincón	111,475,582	814,277	5,470,815	4,656,538	106,819,044
Santa Paula	0	0	2,271	2,271	0
*Sage	0	0	5,970	5,970	0
*Simi	0	0	4,138	4,138	0
South Mountain	19,200,000	0	1,849,981	1,849,981	17,350,019
Ventura	647,970,452	1,330	18,812,470	18,811,140	629,159,312
Totals	786,946,034	911,304	28,333,606	27,422,302	760,786,736
DIST. 3—Arroyo Grande	0	0	702	702	0
Capitan	4,011,017	0	476,752	476,752	3,534,265
*Carmalia	0	0	96,758	96,758	0
Cat Canyon	17,772,754	229,076	1,364,795	1,135,719	16,637,035
Elwood	8,811,048	0	1,060,517	1,060,517	7,750,531
La Galleta Gas	40,044,799	6,676,994	5,709,356	1,967,638	41,012,437
Lompoc	8,994,140	0	29,546	29,546	8,964,594
Orcutt	7,878,106	0	1,263,683	1,263,683	6,614,423
*Russell Ranch	0	315,685	1,092,227	776,542	0
*San Ardo	0	0	4,405	4,405	0
Santa Maria Valley	28,198,344	0	6,164,376	6,164,376	22,033,968
South Cuyama	0	0	25,744	25,744	0
*Summerland (Gas)	0	0	385,328	385,328	0
Totals	** 115,707,107	7,221,755	17,774,159	10,552,404	106,444,182

TABLE III—Continued
NATURAL GAS RESERVES, MCF.

Field	Gas reserves January 1, 1949	Gas injected January to June 1949	Gross Gas withdrawn January to June 1949	Net Gas withdrawn January to June, 1949	Gas reserves July 1, 1949
Distr. 4—Antelope Hills.....	6,702,766	0	119,067	119,067	6,583,699
Ant Hill.....	62,783	0	6,948	6,948	55,835
Belridge North:					
Shallow Zone.....	70,604	0	3,734	3,734	66,870
Tembler Zone.....	19,316,922	2,214,654	127,041	¹ (2,087,613)	21,404,535
"R" Zone.....	62,133,810	0	2,595,886	2,595,886	59,537,924
Wagonwheel Zone.....	73,974,528	0	9,185,443	9,185,443	68,789,085
"Y" Zone.....	3,971,136	211,823	243,063	31,240	3,939,896
Belridge South.....	664,253	0	236,801	236,801	407,452
Blackwell Corner.....	242,800	0	3,600	3,600	239,200
Canal.....	35,617,632	1,977,386	2,286,511	306,125	35,308,507
Canfield Ranch.....	*1,546,134	0	136,667	136,667	1,409,467
Coles Levee, North.....	366,762,459	8,294,938	7,484,578	¹ (810,360)	367,572,819
Coles Levee, North, Gas.....	6,331,536	0	468,178	468,178	5,926,358
Coles Levee, South.....	537,163,364	10,951,283	12,037,138	1,085,855	536,107,779
Coles Levee, South, Gas.....	3,919,219	0	881,596	881,596	3,037,623
Cynacis:					
* Upper Zone.....	0	446,312	976,232	829,920	0
Oceanic Zone.....	4,183,570	0	3,144,962	3,144,962	1,038,608
Point of Rocks Zone.....	3,517,962	0	1,482,182	1,482,182	2,035,780
* Devils Den.....	0	0	3,210	3,210	0
Edison.....	6,687,591	0	1,100,807	1,110,807	8,576,784
Elk Hills, All Zones.....	587,956,288	672,239	1,335,267	663,028	587,293,260
Elk Hills, Gas.....	0	0	†757,741	†757,741	0
Elk Hills, Upper.....	0	†672,239	†280,108	†† (403,134)	0
Elk Hills, Stevens.....	0	0	†308,421	†308,421	0
Fruitvale.....	2,063,816	0	249,843	249,843	1,813,973
Greeley.....	114,535,762	2,155,826	2,757,026	601,200	113,934,562
Kern Front.....	4,068,845	0	174,694	174,694	3,894,151
Kern River.....	54,524	0	6,331	6,331	48,193
Lost Hills.....	4,653,247	0	816,809	816,809	3,836,438
* McDonald Anticline.....	0	0	169,318	169,318	0
* McKittick Temblor.....	0	0	296,324	296,324	0
Midway-Sunset.....	73,968,066	307,910	8,113,123	7,806,213	66,162,873
Midway-Sunset, Buena					
Vista Gas.....	6,896,968	0	477,995	477,995	6,418,973
Mount Poso.....	* 109,225	0	38,765	38,765	70,460
Mountain View.....	1,350,894	0	542,565	542,565	808,329
Paloma, All Zones.....	619,385,036	10,175,872	18,077,567	7,901,695	611,483,341
Paloma, Gas.....	0	0	†675	†675	0
Paloma, Symons Zone.....	0	0	†395,420	†395,420	0
Paloma, Paloma Zone.....	0	†10,175,872	††7,681,472	†7,505,600	0
Poso Creek.....	258,151	0	32,821	32,821	225,330
Rio Bravo.....	151,272,989	2,636,208	3,526,550	860,342	150,382,647
Round Mountain.....	93,617	0	5,565	5,565	88,052
Strand.....	9,999,887	0	76,801	76,801	9,923,086
Strand, East.....	3,881,963	0	56,293	56,293	3,825,700
Tejon.....	1,126,931	0	171,869	171,869	955,062
Ten Section.....	90,608,418	0	4,086,973	4,086,973	86,521,445
Wasco.....	200,330	0	10,134	10,134	190,196
Wheeler Ridge.....	188,841	0	83,238	83,238	135,603
Kern County:					
* Bellevue Area.....	0	0	34,549	34,549	0
* Calders Corner Area.....	0	0	10,437	10,437	0
McClung Area.....	3,500	0	0	0	3,500
Bowerbank Gas.....	33,706,027	0	96,070	96,070	33,609,957
Buttonwillow Gas.....	* 200,000	0	94,295	94,295	105,705
Semitropic Gas.....	10,490,106	0	266,481	266,481	10,223,625
Trico Gas.....	206,462,997	0	4,389,539	4,389,539	202,073,358
Totals.....	3,078,458,667	40,044,451	88,430,986	48,286,435	3,081,115,990

TABLE III—Continued
NATURAL GAS RESERVES, MCF.

Field	Gas reserves January 1, 1949	Gas injected January to June 1949	Gross Gas withdrawn January to June 1949	Net Gas withdrawn January to June, 1949	Gas reserves July 1, 1949
District 5—					
•Coolings	0	0	816,034	816,034	0
•East Coolings Extension	494,764,219	0	16,721,474	16,721,474	478,042,745
•Gunsberg Hills	0	0	554,242	554,242	0
Helm	198,458,914	0	2,178,918	2,178,918	196,279,996
Jaculino	10,070,636	0	1,493,586	1,493,586	8,577,050
•Kettleman Middle Dome	0	0	242,494	242,494	0
•Kettleman North Dome	1,827,499,067	22,240,629	60,060,945	37,820,316	1,589,678,751
Pleasant Valley	17,062,542	0	732,003	732,003	16,330,539
•Pyramid Hills	0	0	5,154	5,154	0
Raisin City	4,487,426	0	332,967	332,967	4,154,459
Riverdale	26,478,658	0	928,621	928,621	25,550,037
•Afton Gas	0	0	537,955	537,955	0
•Cache Slough Gas	0	0	1,515,772	1,515,772	0
Eureka Gas	46,967,071	0	707,182	707,182	46,259,889
•Fairfield Knolls Gas	0	0	141,164	141,164	0
Gill Ranch Gas	29,729,341	0	1,716,053	1,716,053	28,013,288
Kirby Hill Gas	33,165,769	0	1,932,618	1,932,618	31,233,151
Loft Gas	1,064,746	0	647,288	647,288	407,458
•Maine Prairie Gas	0	0	1,028,163	1,028,163	0
Marysville Bottom Gas	16,078,275	0	358,318	358,318	15,719,957
McDonald Island Gas	88,558,982	0	2,394,708	2,394,708	86,164,274
•Miller Gas	0	0	885,305	885,305	0
•Oed Head Gas	0	0	417,515	417,515	0
Rio Vista Gas	2,016,490,303	0	61,425,996	61,425,996	1,955,064,307
•Roberts Island Gas	0	0	179,751	179,751	0
•Suisun Bay Gas	0	0	1,376,161	1,376,161	0
Thornton Gas	20,962,093	0	2,190,309	2,190,309	18,771,784
Tracy Gas	10,410,065	0	230,248	230,248	10,179,817
Vernalis Gas	6,063,033	0	405,954	405,954	5,657,079
Butte County:					
•Chico Area	0	0	72,807	72,807	0
•Durham Area	0	0	258	258	0
Fresno County:					
•Burrell Area	0	0	13,431	13,431	0
•Cheney Ranch Area	0	0	23,713	23,713	0
•San Joaquin Area	0	0	22,347	22,347	0
Kings County:					
•Trice N. W. Area	0	0	98,762	98,762	0
Madera County:					
•Chowchilla Area	20,051,000	0	0	0	20,051,000
•Moffatt Ranch Area	0	0	97,499	97,499	0
San Joaquin County:					
•Galt Area	0	0	86,685	86,685	0
Solano County:					
•Denivation Area	0	0	23,576	23,576	0
•Hooker Area	0	0	3,617	3,617	0
•Winters Area	0	0	285,879	285,879	0
Yolo County:					
•Dunnigan Hills Area	0	0	100	100	0
•Pleasant Creek Area	0	0	2,049	2,049	0
•Winters Area	0	0	84,061	84,061	0
Totals	4,667,070,110	22,240,629	162,791,591	140,550,962	4,534,833,651
Grand totals	9,689,542,778	81,304,567	377,620,080	296,315,562	9,408,254,016

* No reserves estimated because of lack of data or because they are insufficient to justify pipe line connections to marketing system for domestic or industrial consumption.

** Corrected figure. Erroneous total shown in Vol. 34, No. 2.

† Not included in totals.

‡ Net storage. Parentheses indicate negative figures.

§ Dry gas estimate only.

|| Includes 73,449 Mcf. gas withdrawn from storage.

¶ No estimate of reserves made.

‡ Storage only.

§ Best estimate.

COLLECTION OF FUNDS BY ASSESSMENT AND FINANCIAL STATEMENT

The following report is made in accordance with Section 3108, Chapter 93, Statutes of 1939, which reads as follows:

"On or before the first day of October of each year the supervisor shall make public, for the benefit of all interested persons, a report in writing showing:

(a) The total amounts of oil and gas produced in each county in the State during the previous calendar year.

(b) The total cost of the division for the previous fiscal year.

(c) The net amount remaining in the petroleum and gas fund available for the expenses of the succeeding fiscal year.

(d) The total amount delinquent and uncollected from any assessments or charges levied pursuant to this chapter.

The report shall also include such other information as the supervisor deems advisable."

COLLECTION OF FUNDS BY ASSESSMENT

Funds for the support of the Division of Oil and Gas are raised by the assessment of a special tax against the oil industry as provided for in Chapter 93, Statutes of 1939. The rate of assessment is determined in accordance with Sections 3402, 3403, 3404, 3410 and 3411 of the statutes mentioned. The amount of money to be raised annually as provided in Sections 3410 and 3411 is sufficient for the support of the Division of Oil and Gas, and to provide for a surplus of \$50,000. The amount for 1949 is \$429,493.00.

The assessment is levied upon the oil produced and the gas produced and sold in the calendar year just preceding the year in which the tax is levied. For the purpose of this assessment, 10,000 cubic feet of gas is considered equal to one barrel of oil. The rate applied in levying the total assessment is \$0.0011243 per barrel of oil or per 10,000 cubic feet of gas.

The amounts of oil produced and gas produced and sold in 1948 in the various counties of the State are reported and summarized as follows:

County	Non-assessable	Oil produced (bbls) (includes exempt)	Gas produced & sold (10 MCF) (includes exempt)
Butte	-	-	13,127
Contra Costa	-	-	249,906
Fresno	-	46,202,363	5,050,388
Glenn	-	-	150,944
Humboldt	-	-	117,082
Imperial	-	-	* 15,078
Kern	85,916	106,452,935	5,489,974
Kings	-	6,615,556	2,923,171
Los Angeles	73,101	91,984,468	4,306,905
Madera	-	-	261,921
Monterey	-	119,529	-
Orange	-	38,589,589	1,567,353
Sacramento	-	-	7,435,519
San Benito	-	1,251	-
San Bernardino	-	2,434	-
San Joaquin	-	-	709,290
San Luis Obispo	-	464,382	-
Santa Barbara	-	23,993,155	816,955
Santa Clara	-	638	-
Solano	-	740	6,019,269
Sonoma	-	2,363	442
Stanislaus	-	-	12,675
Sutter	-	-	67,944
Tulare	-	-	810,208
Ventura	-	28,911,108	2,468,306
Yolo	-	-	22,223
Actual Production	159,017	343,430,511	38,508,770
Less: Non-Assessable	-	-158,948	-69
Plus: Penalties Levied (Sec. 3409)	-	224,295	-
GRAND TOTALS, ASSESSABLE		343,495,858	38,508,701

* Carbon dioxide.

FINANCIAL STATEMENT—PETROLEUM AND GAS FUND

48-49 Fiscal Year
July 1, 1948 to June 30, 1949

DISBURSEMENTS

Support 48-49 F. Y.:	Salaries and wages	\$240,620.31	
	Operating expenses	74,354.06	
	Equipment	11,260.23	
	Total	\$326,234.60	
	Less: Employees		
	Maintenance deductions	704.00	
Total Support		\$325,530.60	
Transfers to Employees' Retirement System		18,190.63	
Total		\$343,721.23	
Prior years:			
99 F. Y. support	\$48,676.20		
Less: Employees Maintenance	50.00		
	\$48,626.20		
Contributions to Retirement System	10,338.17		
Capital Outlay—Improvements	3,302.94		
98 F. Y. support	45.37		
Total prior years disbursements	\$62,312.68		
Balance in Treasury 6/30/49	\$94,295.14	\$406,033.91	
Less: Claims payable filed 6/30/49	3,369.68		
Balance in fund		90,925.46	
Total disbursements		\$496,959.37	

RECEIPTS

Balance in Treasury 6/30/48	\$75,337.85	
Less: Claims payable filed 6/30/48	8,190.14	
Balance in fund 6/30/48	67,147.71	
Plus: Abatement receivable as of 6/30/48	57.77	
	67,205.48	
Less: Adjustment to claims payable filed	1.53	
Balance in fund as of 6/30/48		\$67,203.95

Receipts from assessments and penalties :

1932	-----	\$50.74	
1938	-----	41.05	
1942	-----	166.57	
1946	-----	5.67	
1947	-----	64.21	
1948	-----	400,112.14	
1949	-----	14,369.44	
			\$423,809.82
Net publication sales	-----		5,921.53
Miscellaneous revenue	-----		24.27
			<u>\$429,755.42</u>
Total receipts	-----		<u>\$496,959.37</u>

List of the delinquent assessments and penalties as of June 30, 1949.

Year	Amount	Year	Amount
1943	\$26.37	1946	\$35.98
1944	14.47	1947	44.06
1945	30.80	1948	69.01
			<u>\$221.29</u>

**REPORTS ISSUED BY STATE OIL AND GAS SUPERVISOR
DURING MONTHS OF JANUARY TO JUNE, 1949
INCLUSIVE**

The accompanying tables show the number and kind of reports issued by the State Oil and Gas Supervisor to oil operators in each field of the State of California during each of the above months.

Reports by the Supervisor are of two kinds, namely, those passing upon proposed operations and those passing upon work which has been inspected or tests which have been witnessed by a representative of the Supervisor during the progress of the work or after completion.

The State is divided into five districts, as follows:

District No. 1, including the counties of Los Angeles, Riverside, Orange, San Diego, Imperial, and San Bernardino.

District No. 2, the county of Ventura.

District No. 3, including the counties of Santa Barbara, San Luis Obispo, Monterey, Santa Cruz, San Benito, Santa Clara, Contra Costa, San Mateo, Alameda, and San Francisco.

District No. 4, including the counties of Tulare, Inyo, and Kern.

District No. 5, including the counties of Fresno, Madera, Kings, Mono, Mariposa, Merced, and all other counties in California not included in any of said other districts.

Field offices are maintained in District No. 1 at Los Angeles, with branch field offices at Long Beach.

In Districts No. 2, No. 3 and No. 5, the field offices are at Santa Paula, Santa Maria, and Coalinga, respectively.

In District No. 4 the main field office is at Bakersfield, with a branch field office at Taft.

MONTH OF JANUARY, 1949

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Dist. 1—Aliso Canyon	1					
Brea-Olinda	5			4	1	
Del Valle	1	2		1		
Dominguez	1	1				
East Coyote	3	2		1		
Huntington Beach	13	9		7	4	
Inglewood	3	2		1		
Lawndale	1					
Long Beach	18	1		8	2	
Montebello	3	2	1	2		
Newhall	5	5				
Newhall Potrero	4	1				
Newport	1			1		
Placencia	7	5				
Playa del Rey	4					
Potrero		1				
Richfield	4	3	1	1		
Rosecrans	3	1				
Santa Fe Springs	3	2		4		1
Seal Beach	5	1		1	1	
Torrance	8			7	1	
West Coyote	3	2				
West Newport	1			1	1	
Whittier	1	1				
Wilmington	29	30		9	3	
Los Angeles County	6	6			1	
Orange County	5	5		1	1	
Totals	137	82	2	49	15	2
Dist. 2—Bardonia	3	2	1			
Ojai	3	2				
Piru	1					
Rincon	6	4		1	1	
Santa Paula		1				
Sespe	2	1				
Simi	1	1				
South Mountain	2	2			1	
Ventura	6	3	1	3		
West Montalvo		1				
Ventura County	1	1				
Totals	23	18	2	5	2	
Dist. 3—Arroyo Grande	1	1				
Cat Canyon	5	3	1	2	1	
Elwood	1			3		
Goleta		1				
Mesa			1	1		
Orcutt	2	2		2		
Russell Ranch	4	9			3	
San Ardo	3	4				
Santa Maria Valley				2	1	
Zaca	1					
Monterey County		2			7	
San Benito County			1		1	
San Luis Obispo County	1	3	1		4	
Santa Barbara County	1	5			7	
Totals	19	30	4	11	23	
Dist. 4—Antelope Hills		1				
Canfield Ranch	2					
Cymric				2		
Devils Den	2	4				
Edison	7	3	1	4		
Elk Hills	3			5		
Fruitvale	3	1		2		
Groesby	1		1			
Kern Bluff	7	10			3	
Kern Front						
Kern River	15	13	1	1	4	
Lost Hills	2	1				
McDonald Antelope		1				
McKittrick	3	1	1		3	

MONTH OF JANUARY, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Dist. 4—Continued						
Midway.....	10	8		4	4	
Mt. Paso.....	2	1			2	
Mountain View.....	6			5	1	
North Oaks Levee.....	2	2	1		1	
Paloma.....		3				
Paso Creek.....	1	1	1		1	
Round Mountain.....	3	3			3	
South Belridge.....	7	11				
Susnet.....	10	7	1	4	2	
Tegon.....	2				1	
Tegon Hills.....		1			2	
Tren Gas.....			1		1	
Wheeler Ridge.....	2	1				
Kern County.....	4	6	2	2	11	
Tulare County.....	1		1		1	
Totals.....	100	79	11	20	40	
Dist. 5—Coalings	11	10	2	5		
East Coalings Extension.....	2			2		2
Guajarral Hills.....	8	1				
Helm.....					1	
Jaculiton.....		2			1	
Kettleman North Dome.....	1			2		
Kettleman Middle Dome.....	1		1			
Pleasant Valley.....	1					
Raisin City.....	2	3			1	
Rio Vista Gas.....				2		
Riverdale.....					3	
Fresno County.....	1	1			1	
Glenn County.....			1			
San Joaquin County.....					1	
Stanislaus County.....					1	
Yolo County.....					1	
Totals.....	27	17	4	11	10	2
Grand totals.....	306	226	23	105	90	4

¹ Wells not in proved oil fields are designated by county only.

SUMMARY OF OPERATIONS—OIL FIELDS

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MONTH OF FEBRUARY, 1949

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Distr. 1—Aliso Canyon.....	1	1		1		
Brea-Olinda.....	2	3		2		
Del Valle.....	2	2				
Dominguez.....	2			2		
East Coyote.....	4	1				
East Los Angeles.....	1	1	1			
Huntington Beach.....	17	13		7	1	
Inglewood.....	3	2				
Long Beach.....	9	6		6	1	
Los Angeles City.....				2		
Montebello.....	1	3		2		
Newhall.....	6	3			2	
Newhall-Potrero.....	5	2				
Newport.....	1			1		
Placerita.....	8	5		1		
Potrero.....	2	2				
Richfield.....	3	1		2		
Rosecrans.....	4	3				
Santa Fe Springs.....	1			5		
Seal Beach.....	4	1		1		
Torrance.....	11	2		3	4	1
West Coyote.....	1	2				
West Newport.....	2			4		
Wilmington.....	18	10		12		
Los Angeles County.....	6	4		1	5	
Orange County.....	3	2		1	1	
Totals.....	117	69	1	54	15	1
Distr. 2—Bardadale.....	2					
Ojai.....	2					
Piru.....		2			1	
Rincon.....		5		1		
Sespe.....	2				1	
Simi.....	3	1		1		
South Mountain.....	10	5		4		
Ventura.....	3	2			3	
Ventura County.....						
Totals.....	28	17	0	6	5	0
Distr. 3—Arroyo Grande.....	1					1
Cat Canyon.....	1	4		1	2	
Elwood.....	1			1		
Goleta.....	1					
Orcutt.....	3	2		2		
Rio Vista Gas.....				1		
Russell Ranch.....	14	12			1	
San Ardo.....	8	4	1			
Santa Maria Valley.....	1				2	
Monterey County.....		3			2	
San Benito County.....		1			1	
San Luis Obispo County.....	2	0		2		
Santa Barbara County.....		4			6	
Totals.....	32	36	1	7	15	1
Distr. 4—Canfield Ranch.....	3	2				
Cymric.....					1	
Edison.....	9	8		1	3	
Elk Hills.....	4	3		2		
Fruitvale.....	4	3		3		
Kern Bluff.....	8	6				
Kern Front.....	1				1	
Kern River.....	2	4	1	1	2	
McKittrick.....	2	1				
Midway.....	15	4	1	6	3	
Mountain View.....	5			6	1	1
North Belridge.....		1				
North Cohn Leves.....	4	2				
Paloma.....	4			1		
Poso Creek.....	1					
Round Mountain.....	1				1	
South Belridge.....	7	11		1		
Sunset.....	6	2				

MONTH OF FEBRUARY, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Dist. 4—Continued						
Tejon.....						1
Tejon Hills.....	3	7			2	
Ten Section.....		1				
Wheeler Ridge.....	1	1				
Kern County.....	9	11	2		11	
Tulare County.....		2			1	
Totals.....	80	72	4	21	27	2
Dist. 5—Coolings	13	10		4		1
East Coolings Extension.....	1			2		
Gujarral Hills.....	8	4				
Jacalton.....	2	2		2		
Kettleman North Dome.....	3	1		3		
Pleasant Valley.....	1				1	
Raisin City.....	2	1	1	1	1	
Rio Vista Gas.....			1	1		
Riverdale.....	1					
Prunes.....	1	3			1	
Humboldt County.....		1				
San Joaquin County.....					3	
Solano County.....		2				
Sonoma County.....		1				
Totals.....	32	25	2	12	6	1
Grand totals.....	298	219	8	100	68	5

¹ Wells not in proved oil fields are designated by county only.

SUMMARY OF OPERATIONS—OIL FIELDS

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MONTH OF MARCH, 1949

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supple- mentary		First	Supple- mentary
DIST. 1—Aliso Canyon		1		1		
Brea-Olinda	3	4	1	1	1	
Del Valle	3			1		
Dominguez	1			1		
East Coyote	3			2	3	
East Los Angeles	1					
Huntington Beach	23	8		5	3	
Imperial Carbon Dioxide Gas		3				
Inglewood	6	8				
Lawndale		1				
Long Beach	13	4		6	1	
Montebello	4	1		4		
Newhall	8	2			3	
Newhall Potrero	2	1				
Placencia	11	12	1	1		
Playa del Rey	2					
Potrero	3					
Richfield	4	2				
Rosecrans	2	2				
Santa Fe Springs				10	1	
Seal Beach	4					
Torrance	13	2		2		1
West Coyote	6	4	2	1		
West Newport	8					
Whittier	2	1				
Wilmington	13	10	1	10		
Los Angeles County	9	2		2	5	
Orange County	2	1			2	
San Bernardino County	3				3	1
Totals	150	67	5	47	22	2
DIST. 2—Bardale		1				
Ojai	2		1		1	
Piru	2	2		2		
Rincon	8	4		1		
Santa Paula	1	1				
Simi		1				
South Mountain	3	5		2		
Ventura	12	11		6		
West Montalvo	4				2	
Ventura County					1	
Totals	34	25	1	11	4	
DIST. 3—Arroyo Grande		1				
Casmalia	1	1				
Cat Canyon	7	1	1	2		
Elwood	1			2		
La Galleta Gas					1	
Orcutt	3	2				
Russell Ranch	8	13	1			
San Ardo	6	9				
Santa Maria Valley	3	1				1
South Cuyama		1				
Zaca	1					
Monterey County		5			3	
San Luis Obispo County		7				
Santa Barbara County	1	4	1		6	
Totals	30	45	3	4	10	1
DIST. 4—Blackwell Corner		1				
Cainfield Ranch	4	3				
Cymric	4	5		2		
Devils Den						
Edison	17	5		5	2	1
Elk Hills	6	3	1			
Fruitvale	7					
Greeley				1		
Kern Bluff	5	10			2	
Kern River	12	8	1			
Lost Hills				1		
McDonald Anticline			1		2	
McKittrick	1	1				

MONTH OF MARCH, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Durr 4—Continued						
Midway	11	3	1	3	6	
Mt. Paso	1	1			1	
Mountain View	5	2		2	1	
North Oaks Levee	4	3				
Paloma	3	1			2	
Paso Creek	4	1	1			
Round Mountain	2	1			2	
Semitropic Gas					1	
South Belridge	15	22		1		
Strand	2					
Sunset	9	7	2	3	1	
Tejón		2				
Tejón Hills	3	3			3	
Ten Section	1	1				
Kern County	7	15	2		7	1
Tulare County	1	1				
Totals	123	98	9	23	30	2
Durr 5—Coolinga	11	9	1	5		
East Coolinga Extension	2			2	1	
Eureka Gas	1					
Guajarral Hills	7	4				
Heim	1			1	1	
Jaculito		2	1			
Kettleman North Dome	3	1		1		
Pleasant Valley			1	1	1	
Raisin City	1			2		
Rio Vista Gas	1	1				
Riverdale	1			2		
Thornton Gas				1		
Fresno County	2	4				
Humboldt	1					
Kings County		1				
San Joaquin County		2				
Solano County	1				3	
Totals	32	24	3	15	6	
Grand totals	369	259	21	100	72	5

¹ Wells not in proved oil fields are designated by county only.

MONTH OF APRIL, 1949

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supple- mentary		First	Supple- mentary
DIST. 1—Aliso Canyon			2			
Brea-Olinda	4					
Del Valle	2	1		2		
Dominguez	1	1				
East Coyote	3	2		1	1	
East Los Angeles	1					
Huntington Beach	10	14		1	1	1
Inglewood	7	2				
Lawndale	1				3	
Long Beach	21	10		4	3	
Montebello	1			3	1	
Newhall	2					
Newport						
Placentia	11	10	1	1	1	
Playa del Rey	2					
Potrero	2					
Richfield	1			3		
Rosecrans	10	2	1	4		
Santa Fe Springs				4		
Seal Beach	2	1		1		
Torrance	7			2	2	1
West Coyote	3	1	1			
West Newport	1	1		3		
Whittier		1		1	1	
Wilmington	21	17		12		
Los Angeles County	1	3	1		2	
Orange County	3	1			2	
Riverside County		1				
San Bernardino County	2					
San Diego County		1				
Totals	121	71	4	46	18	2
DIST. 2—Barddale						
Ojai	1					
Piru	2	1				
Rincon	5	3		1	1	
Santa Paula	2	3		1		
Sespe	1	4				
Simi		2				
South Mountain	2	3				
Ventura	6	1		3		
Ventura County		1	1			
Totals	20	18	1	5	1	
DIST. 3—Arroyo Grande						
Casmalia	1			1		
Cat Canyon	2	2		2		1
Elwood					1	
Moss	1			1		
Orcutt	2	2				
Russell Ranch	10	9	1	1		
San Ardo	5	4				
Santa Maria Valley	2	2		1		
South Cuyama		1	1	1		
Zaca	1	1				
Monterey County		6			1	
San Benito County	1	1				
San Luis Obispo County		9	1		3	
Santa Barbara County	2	1			3	
Totals	20	44	3	6	10	1
DIST. 4—Buttonwillow Gas						
Canfield Ranch	4	1				
Cymric	5	1		1		
Devile Den		3			1	
Edison	16	6	1	1	1	
Elk Hills	7	2	1			
Fruitvale	6	3		3		
Orcutt		1				
Kern Bluff		7				
Kern Front	1	1			2	
Kern River	10	4	1	1	1	

MONTH OF APRIL, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
DIST. 4—Continued						
Lost Hills	2	1	1			
McDonald Anticline					1	
McKittrick	2	1			1	
Midway	14	6			5	1
Mt. Poso	1	1		1		
Mountain View	4			6	1	
North Belridge		1				
North Coles Levee	4					
Paloma	5	2	1			
Poso Creek	1	1				
Rio Bravo					1	
Round Mountain	2	2	1		3	
Semitropic Gas					6	
South Belridge	18	16				
South Coles Levee			1			
Sunset	11	5		4	1	
Tejon	2					
Tejon Hills	7	7	1		3	
Ten Section	2					
Kern County	3	15	1		9	
Tulare County	1				1	
Totals	136	89	10	18	38	1
DIST. 5—Cache Slough Gas						
Coolinga	1		2	1		
East Coolinga Extension	3	1		5	3	
Guljaral Hills	5	4	1		1	
Jacalton	5	1				
Kettleman North Dome	1		1	1		
Pleasant Valley	3			1	1	1
Raisin City		1				
Riverdale	1					
Fresno County	1	3	1		2	
Madera County		1				
San Joaquin County					1	
Solano County		1		1		
Totals	30	15	5	9	8	1
Grand totals	327	237	23	84	75	5

¹ Wells not in proved oil fields are designated by county only.

MONTH OF MAY, 1949

Field or county	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
DIST. 1—Aliso Canyon.....	4	1				1
Brea-Olinda.....	1	2		4		
Del Valle.....	1	1		3		
Dominguez.....	2	2		1	1	
East Coyote.....	5	2				
Huntington Beach.....	13	7	1	8	1	
Inglewood.....	5	3		2		
Lawndale.....	3					
Long Beach.....	25	3	1	4	1	
Montebello.....	4			3		
Newhall.....	1	1				
Newhall Potrero.....	5	2				
Placita.....	15	19		1	2	
Potrero.....	3	1				
Richfield.....	2	2		1		
Rosecrans.....	5			2		
Santa Fe Springs.....	4	1		1		
Seal Beach.....	2	2				
Torrance.....	3			3	4	
West Coyote.....	7	2		1		
West Newport.....	4	1		1		
Whittier.....	2					
Wilmington.....	19	33		5		
Los Angeles County.....	9	6				
Orange County.....	5	2		1	2	
Riverside County.....	1				1	
San Bernardino County.....	1	1				
Totals.....	153	96	2	37	14	1
DIST. 2—Bardsdale.....	2	2			1	
Ojai.....	2		1			
Piru.....	2	2				
Rincon.....	4			2		
Santa Paula.....	1	3				
Sepe.....	2					
Simi.....	1					
South Mountain.....	5	5	1			
Ventura.....	11	4	1	5		
Ventura County.....	2					
Totals.....	32	16	3	7	1	
DIST. 3—Arroyo Grande.....	1					
Casmalia.....	1					
Cat Canyon.....	1	4	1			1
Mesa.....					10	
Orcutt.....	1	2	1			
Russell Ranch.....	10	10	1			
San Ardo.....	5	12				
Santa Maria Valley.....	3			1	1	
South Cuyama.....	2	3				
Summerland.....		1				
Zaca.....	1	2				
Monterey County.....		1			3	
San Benito County.....		1				
San Luis Obispo County.....	3	5			6	
Santa Barbara County.....	4	5	1		2	
Santa Cruz County.....		1				
Totals.....	36	47	4	1	23	1
DIST. 4—Buttonwillow Gas.....					1	
Canal.....				1		
Canfield Ranch.....	2		1			
Cymric.....		1		2		
Devils Den.....	1		1			
Edison.....	5	6	1			
Elk Hills.....	5	4		1		
Fruitvale.....	5	1		3		
Groesby.....				2		
Kern Bluff.....	3	3				
Kern River.....	5	9			1	
Lost Hills.....	1	1				
McDonald Anticline.....	1					

MONTH OF MAY, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
Dist. 4—Continued						
McKittrick	2	1			1	
Midway	9	4		5	2	
Mt. Poso					1	
Mountain View	11	3		5	5	
North Belridge	1					
North Coles Levee	2					
Paloma	1	4	1	1	1	
Poso Creek					1	1
Rio Bravo						1
Round Mountain		1			1	
Semitropic Gas	1					
South Belridge	10	4	2	3	1	
Sunset	7	4		1		
Tolon Hills	3	10	1		3	
Wheeler Ridge	1	2				
Kern County	9	11		2	9	
Totals	91	69	7	26	27	2
Dist. 5						
Coolings	7	3				
East Coolings Extension	8			1	3	
Guajarral Hills	8	6				
Helm				1		
Jacalitos	2					
Kettleman North Dome	2	1		5		
Kettleman Middle Dome	1					
Pleasant Valley	1					
Rainn City	1	1		1		
Rio Vista Gas		1	1			
Riverdale	1			3		
Colusa County		1				
Fresno County		1	1	1	2	
Lake County		1				
Marin County					1	
Sacramento County		1				
San Joaquin County	2				1	
Sonoma County		1			1	
Yolo County		1				
Totals	33	18	2	12	8	
Grand totals	345	246	18	83	72	4

¹ Wells not in proved oil fields are designated by county only.

SUMMARY OF OPERATIONS—OIL FIELDS

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MONTH OF JUNE, 1949

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
DIST. 1—Aliso Canyon	2					
Brea-Olinda	4	1				
Del Valle	3			1		
Dominguez	1				1	
East Coyote	1	1		1	1	
East Los Angeles	1					
Huntington Beach	20	7	2		1	
Imperial Carbon Dioxide Gas				1		
Inglewood	3	3		1		
Lawndale	6					
Long Beach	18	1		6		
Montebello	2				1	
Newhall	4			2	2	
Newhall Potrero	1	1				
Pacerita	21	19		1		
Potrero	2				1	
Richfield	3	2	1		1	
Rosecrans	3				1	
Santa Fe Springs	1			2		
Seal Beach	2					
Torrance	7	1		1		
West Coyote	3	1				
West Newport	4	1	1		1	
Whittier	2	3				
Wilmington	19	5	3	2	1	
Los Angeles County	5				2	
Orange County	10	1			4	
San Bernardino County		1				
Totals	148	48	7	31	15	
DIST. 2—Bardendale		1		1		
Ojai		1				
Piru	3		1			
Rincon	5	1				
Santa Paula	1					
Sespe	1	1				
South Mountain	4	3				
Ventura	7	10	1	1	1	
West Montalvo	1					
Ventura County	1				1	
Totals	22	18	2	2	2	
DIST. 3—Arroyo Grande			1			
Capitan	2			1		
Carmalia		1				
Cat Canyon	7	3	1	1		
Mims	1					
Orcutt	4	2				
Russell Ranch	14	12	1	1	1	
San Ardo	4	1				
South Cuyama	6	9				
Zaca	1					
Monterey County		4			4	
San Benito County		1			1	
San Luis Obispo County		6	2		10	
Santa Barbara County	2				1	
Santa Cruz County					1	
Totals	41	39	5	4	23	
DIST. 4—Blackwell Corner					1	
Buttonwillow Gas	4					
Canfield Ranch	1	1			1	
Cymric	1				1	
Devils Den	1					
Edison	9	3				
Eds Hills	9	5		2	1	
Fruitvale	2	1		4		
Greeley	1	1				
Kern Bluff	4	1		1		
Kern Front	2	1		1		
Kern River	7	3			2	1
Lost Hills	3	2		1		

MONTH OF JUNE, 1949—Continued

Field or county ¹	Tests	Proposals				
		New wells		Deepen or redrill	Abandon	
		Drill	Supplementary		First	Supplementary
DIST. 4—Continued						
McDonald Anticline					1	
Midway	9	1	2	1		
Mt. Paso		1				
Mountain View	20		1	3	1	
North Belridge		1			1	
North Oaks Levee	1	1				
Paloma	5					
Paso Creek	2	2		4		
Semitropic Gas	4					
South Belridge	10	7		1		
Sunset	3	6		2	2	
Tojo Hills	3	5			4	
Ten Section	2	2		1		
Whisper Ridge	1					
Kern County	7	10	2		30	
Totals	111	61	5	24	35	1
DIST. 5—Coalinga	5		1	1	3	
East Coalinga Extension	1	1	1	1		
Guajarral Hills	6	4				
Helm				2		
Jacubian	1		1			
Kettleman North Dome	1			4		
Kettleman Middle Dome			2			
Raisin City	2	3		1		
Rio Vista Gas	2		1			
Riverdale	3			2		
Colusa County		1			1	
Fresno County	2	1	3	2	3	
Glenn County			1			
Kings County		1				
Madera County	1					
Solano County				1	1	
Tehama County						
Yuba County		1				
Totals	24	13	10	14	7	
Grand totals	346	179	20	75	83	1

¹ Wells not in proved oil fields are designated by county only.

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 Resume of oil field operations in California in 1945.
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- No. 1. Schist Surface of the Western Los Angeles Basin, by J. Lloyd White.
 Production statistics of California oil fields, January 1, 1946, to June 30, 1946.
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- No. 2. Trico Gas Field, by Wm. C. Bailey and Ralph M. Barger.
 West Newport Oil Field, by Chas. H. Corwin.
 Resume of oil field operations in California in 1946.
 Production statistics of California oil and gas fields—1946.
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- No. 1. Tidelands Pools of Huntington Beach oil field, by Eugene R. Murray-Aaron.
 Production Statistics of California oil fields, January 1, 1947, to June 30, 1947.
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 Oxnard oil field, by E. J. Kaplow.
 Resume of oil field operations in California in 1947.
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- No. 1. Rio Vista gas field, Re-estimate of gas reserve, Vol. 34, No. 1, by R. G. Frame.
 Tejon Oil Field, by Fred E. Kasline.
 Production statistics of California oil fields, January 1, 1948, to June 30, 1948.
 Collection of funds by assessment and financial statement.
- No. 2. Recent Developments in the Wilmington oil field, by Eugene R. Murray-Aaron and Adolph W. Pfeil.
 Resume of Oil Field Operations in 1948.
 Production Statistics of California Oil Fields, July 1 to December 31, 1948.
 Wildcat Wells Abandoned in 1948.
 Proved Acreage by Counties, December 31, 1948.
 Directory of California Oil Operators.

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VOLUME 35

- No. 1. Paloma Oil Field, by G. G. Peirce.
 Recent Developments in the Tar Sands of the Townlot Area, Huntington Beach Oil Field, by J. M. Carls.
 Preliminary Report on Kirby Hill Gas Field, by Ralph G. Frame.
 Production Statistics of California Oil Fields, January 1 to June 30, 1949.
 Collection of Funds by Assessment and Financial Statement.

OIL AND GAS FIELD MAPS

The following maps of the oil and gas fields of the State have been completed and placed on sale at the Division of Oil and Gas, Ferry Building, San Francisco, and the various branch offices.

The maps are revised from time to time as development work advances and ownerships change.

Map No.	Price (including postage)
1 — Sargent, Santa Clara County	\$.75
2 — Cat Canyon and Zaca, Santa Barbara County	1 .25
3 — Orcutt, Casimilla and Lompoc, Santa Barbara County	1 .25
4 — Brea Olinda and East Coyote, Los Angeles, Orange Counties	1 .25
6 — Salt Lake-Beverly Hills, Los Angeles County	1 .25
7 — Sunset, including San Emidio, Kern County	1 .25
8 — South Midway, including Buena Vista Hills, Kern County	1 .25
9 — North Midway and McKittrick, portion of Cymric, Kern and San Luis Obispo Counties	1 .25
10 — South Belridge, Cymric and Temblor, Kern County	1 .25
11 — Lost Hills and North Belridge, including Antelope Hills, Kern County	1 .25
12 — Devils Den and Blackwells Corner, Kern County	1 .00
13 — Kern River, Kern County	1 .00
13A — Poso Creek and Kern Front, Kern County	1 .00
14 — Coalinga, Jacaliton, and East Coalinga Extension, Fresno County	1 .50
15 — Elk Hills, Kern County	1 .25
16 — Ventura and Rincon, Ventura County	1 .75
17 — Santa Paula-Ojai, including South Mountain, Ventura County	1 .25
18 — Sespe-Piru-Simi, including Bardsdale, Ventura County	1 .50
18A — Newhall, Aliso Canyon, Newhall-Potrero, Del Valle and Oak Canyon, Los Angeles County	1 .25
19 — Arroyo Grande, San Luis Obispo County	1 .00
20 — Long Beach, Los Angeles County	1 .75
21B — District 5, boundaries of areas including oil fields, Fresno, Kings and Kern Counties	1 .00
21C — District 4, boundaries of areas including oil fields, Kern, Kings and Tulare Counties	1 .25
22 — District 3, boundaries of areas including oil fields, Santa Barbara County	.75
23 — District 2, boundaries of areas including oil fields, Ventura County	1 .00
24 — District 1, boundaries of areas including oil fields, Los Angeles and Orange Counties	1 .00
26 — Huntington Beach, Orange County	1 .50
27 — Santa Fe Springs, Los Angeles County	1 .25
28 — Torrance, Los Angeles County	1 .25
28A — Town Lot Area, Torrance Field, Los Angeles County	.75
29 — Dominguez, Los Angeles County	1 .00
30 — Rosecrans, Los Angeles County	1 .25
31 — Inglewood, Los Angeles County	1 .25
32 — Seal Beach, Los Angeles and Orange Counties	1 .25
34 — Mt. Poso, Kern County	1 .00
35 — Round Mountain, Ant Hill, and Kern Bluff, Kern County	1 .00
36 — Kettleman North Dome and Middle Dome, Fresno and Kings Counties	1 .50
37 — Montebello, Los Angeles County	1 .00
38 — Whittier and Turnbull, Los Angeles County	1 .25
39 — West Coyote, Los Angeles and Orange Counties	1 .25
40 — Elwood, Goleta (abandoned), La Goleta (Gas), Santa Barbara County	1 .25
41 — Potrero, Los Angeles County	1 .00
42 — Playa del Rey, Los Angeles County	1 .50
43 — Capitan, Santa Barbara County	1 .00
44 — Mesa, Santa Barbara County	1 .50
45 — South Cuyama and Russell Ranch, Santa Barbara and San Luis Obispo Counties	1 .00
46 — Richfield, Orange County	1 .25
47 — San Ardo, Monterey County	1 .00
48 — Mountain View and Edison, Kern County	1 .25
49 — Fruitvale, Kern County	1 .25
50 — Wilmington, Los Angeles County	1 .25
51 — Santa Maria Valley, Santa Barbara County	1 .00
52 — El Segundo and Lawndale, Los Angeles County	1 .50
53 — Rio Bravo and Greeley, Kern County	1 .00
54 — Wasco Oil Field, Buttonwillow and Semitropic (Gas), Kern County	1 .25
55 — Canal, Canfield Ranch, Coles Levee, Strand, Ten Section, Kern County	1 .25
56 — Paloma, Kern County	1 .25
57 — Rio Vista Gas, Sacramento, Contra Costa and Solano Counties	1 .00
58 — Trico Gas, Kern, Kings and Tulare Counties	1 .00
59 — Raisin City, Helm and Riverdale, including Lanare Area, Fresno County	1 .25
60 — West Newport and Newport, Orange County	1 .50
61 — Wheeler Ridge and Tejon, Kern County	1 .00
62 — Gujarral Hills, Fresno County	1 .00

PUBLICATIONS OF DIVISION OF MINES

Relating to Petroleum and Gas

- Bulletin 3—Gas and Petroleum Yielding Formations of the Central Valley of California, W. L. Watts, 1894.
- Bulletin 11—Oil and Gas Yielding Formations of Los Angeles, Ventura and Santa Barbara counties, W. L. Watts, 1896.
- Bulletin 15—Map of Oil City Oil Fields, Fresno County, J. H. Means.
- Bulletin 19—Oil and Gas Yielding Formations of California, W. L. Watts, 1900.
- Bulletin 21—Chemical Analyses of California Petroleum (tabulated sheets), H. N. Cooper, 1903.
- Bulletin 22—Production and Use of Petroleum in California, P. W. Prutzmann, 1904.
- Bulletin 63—Petroleum in Southern California, P. W. Prutzmann, 1912.
- Bulletin 69—Petroleum Industry of California, with folio of maps (18 x 22 in.), R. P. McLaughlin and C. A. Waring, 1914.
- Bulletin 73—Report of Operations of Department of Petroleum and Gas for 1915-1916, R. P. McLaughlin, 1917.
- Bulletin 82—Second Annual Report of the State Oil and Gas Supervisor, 1916-1917, R. P. McLaughlin, 1918.
- Bulletin 84—Third Annual Report of the State Oil and Gas Supervisor, 1917-1918, R. P. McLaughlin, 1918.
- Bulletin 89—Petroleum Resources of California, Lawrence Vander Leek, 1921.
- Preliminary Report No. 1—Notes on Damage by Water in California Oil Fields, R. P. McLaughlin, December, 1913.
- Preliminary Report No. 2—Notes on Damage by Water in California Oil Fields, R. P. McLaughlin, March, 1914.

The above publications are out of print, but may be referred to in any public library or in the library of the Division of Mines.

- Bulletin 118—Geologic Formations and Economic Development of the Oil and Gas Fields of California, Olaf P. Jenkins, April, 1940.

Part 1—Development of the Industry, April, 1940.

Part 2—Geology of California and the Occurrence of Oil and Gas, August, 1941.

Part 3—Descriptions of Individual Oil and Gas Fields, March, 1943.

Part 4—Glossaries, Bibliography, and Index, Including Outline Geologic Map of California Showing Oil and Gas Fields and Drilled Areas, March, 1943.

Geological map, "Oil and Gas Fields" (showing California geology, uncolored).